NATIONAL MUSEUM OF VICTORIA

# THE JOURNAL of The Department OF AGRICULTURE

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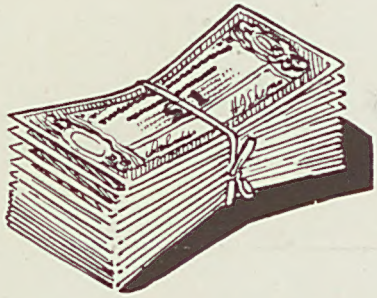

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*Issued by direction of the Hon. E. J. Hogan, M.L.A., Minister of Agriculture.*

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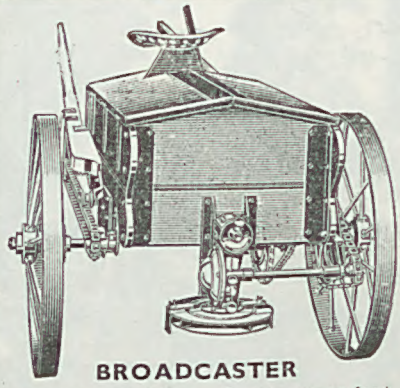

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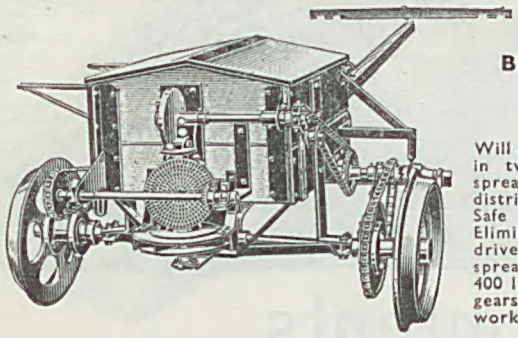

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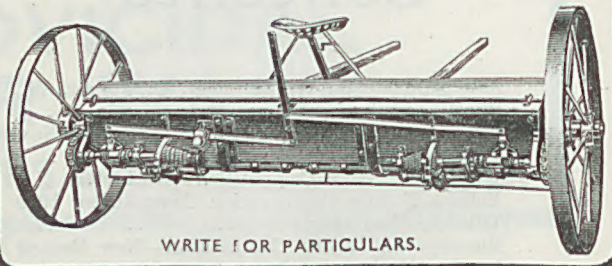

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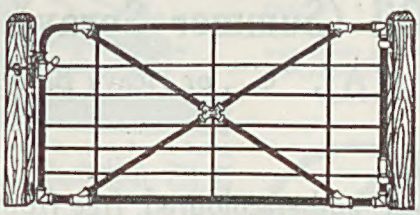

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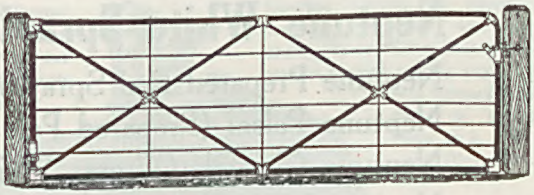

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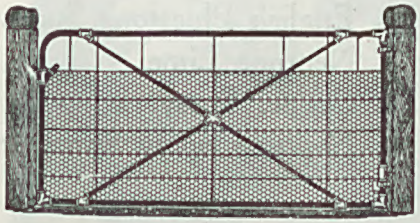

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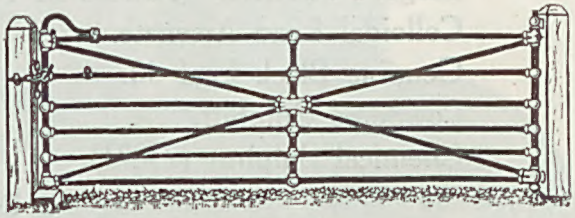

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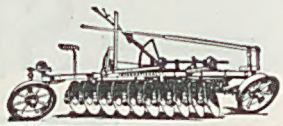

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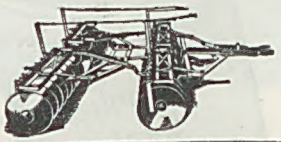

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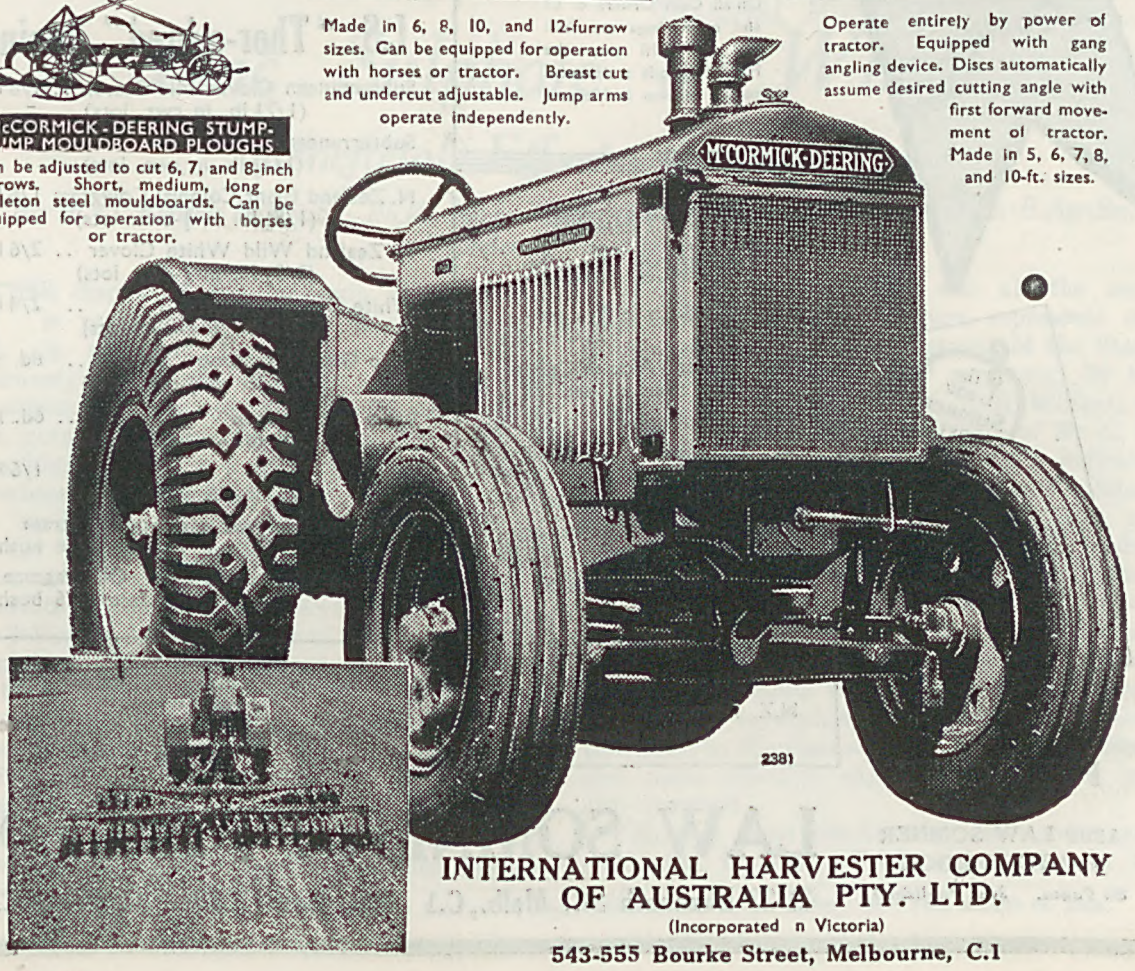


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The Journal of the Department of Agriculture of Victoria.

April, 1939.

*Zinc trials at Salisbury, 1937, showing response from 30 lb. zinc sulphate.*

NATIONAL MUSEUM OF VICTORIA

# Zinc Sulphate on Wheat

## Beneficial Effects Confirmed

*By H. C. Forster, M.Agr.Sc., Ph.D., Senior Cereal Research Officer, and H. L. Hore, B.Agr.Sc., Inspector of Agriculture.*

THE discovery that optimum plant growth is produced only when there is present in the soil, in addition to the more commonly recognized essentials, small amounts of certain minerals other than phosphate, nitrate, and potash, has greatly widened the scope of experimental work in recent years. It is indeed fortunate that because these minor elements are needed only in small amounts, they are usually present in sufficient quantities in most soils, and the occurrence of deficiency areas is therefore relatively rare. Recent work, however, has indicated that a number of areas in Australia respond to the application of one or the other of these minor elements and the Department is investigating many districts in Victoria from this point of view.

That the Wimmera district of this State is possibly one of these deficiency areas was first indicated in 1936 when increased yields were obtained following the application of zinc sulphate to cereal crops. This fact was all the more remarkable since the Wimmera represents one of the best wheat-growing districts of the State.

In that year, experiments* conducted by the Departmental Pathologist, Mr. C. R. Millikan, on the control of eelworm on the farm of Mr. C. P. Dahlenburg at Winiam, near Nhill, indicated that with an application of 30 lb. of zinc sulphate in addition to 1 cwt. of superphosphate per acre at seeding time, increases of over 9 bushels per acre in the resultant wheat crop were obtained. The treated plants showed superior growth throughout their life, both with regard to greater height as well as depth of green colour, and commenced heading two weeks earlier than those receiving superphosphate alone. Greater resistance to the diseases of foot rot and eelworm and more effective suppression of weeds was also observed.

Following these results, zinc tests were again conducted in 1937. Trials were sown in the

* C. R. Millikan. "Preliminary Note on the Relation of Zinc to Disease in Cereals." *J. Dept. Agr. Vict.* 36: 409-16. 1938.

Wimmera at Winiam, at Salisbury on the farm of Mr. E. W. Dahlenburg, and at Longerenong Agricultural College. Additional tests were also sown at the State Research Farm, Werribee, and at the Mallee Research Station, Walpeup. Increases in growth similar to that obtained in 1936 were again observed in the Wimmera, but at Werribee and Walpeup no responses to the mineral were obtained.

### *1938 Tests.*

In 1938, the field investigations were considerably extended, and a very comprehensive series of experiments with zinc and other minerals was undertaken at more than twenty centres throughout the State. Fifteen of these trials were conducted in the various districts of the Wimmera from Kaniva in the west to as far east as Charlton, care being taken to locate tests on each of the main soil types. The remaining trials were placed on typical soils in the other districts of the State. In addition to these tests a questionnaire, to obtain the farmer's personal experience with this mineral, was forwarded to more than 70 men who had used zinc on their own crops last year.

The results from the 1938 experiments, tabulated below, show that the application of zinc sulphate again resulted in increasing the yield of wheat in most districts of the Wimmera, but elsewhere in the State, no indication of response to this mineral was obtained.

TABLE I.—RESULTS OF ZINC SULPHATE TRIALS—MAJOR CENTRES—1938.

| Treatment. | Longerenong (Black Soil). | | Salisbury (Black Soil). | |
|---|---|---|---|---|
| | Yield. | Increase due to Zinc. | Yield. | Increase due to Zinc. |
| | bus. per acre | bus. per acre | bus. per acre | bus. per acre |
| No manure .. .. | 16·9 | .. | 27·7 | .. |
| Zinc sulphate, 1 lb. per acre | 19·6 | 2·7 | 28·3 | 0·6 |
| Zinc sulphate, 5 lb. per acre | 22·4 | 5·5 | 28·6 | 0·9 |
| Zinc sulphate, 10 lb. per acre | 20·2 | 3·3 | 28·4 | 0·7 |
| Zinc sulphate, 20 lb. per acre | 21·1 | 4·2 | 28·3 | 0·6 |
| Super., ½ cwt. per acre .. | 18·3 | .. | 26·6 | .. |
| Super., ½ cwt. + zinc, 1 lb. per acre .. .. | 21·7 | 3·4 | 28·5 | 1·9 |
| Super., ½ cwt. + zinc, 5 lb. per acre .. .. | 19·5 | 1·2 | 29·4 | 2·8 |
| Super., ½ cwt. + zinc, 10 lb. per acre .. .. | 20·0 | 1·7 | 30·6 | 4·0 |
| Super., ½ cwt. + zinc, 20 lb. per acre .. .. | 20·9 | 2·6 | 31·5 | 4·9 |
| Super., 1 cwt. per acre .. | 20·5 | .. | 28·2 | .. |
| Super., 1 cwt. + zinc, 1 lb. per acre .. .. | 19·9 | −0·6 | 30·4 | 2·2 |
| Super., 1 cwt. + zinc, 5 lb. per acre .. .. | 24·3 | 3·8 | 32·5 | 4·3 |
| Super., 1 cwt. + zinc, 10 lb. per acre .. .. | 22·0 | 1·5 | 31·8 | 3·6 |
| Super., 1 cwt. + zinc, 20 lb. per acre .. .. | 22·3 | 1·8 | 31·2 | 3·0 |
| Standard error .. .. | 1·3 | .. | 0·9 | .. |

(Treatments replicated three times.)

*General view of 1938 Salisbury observation plots of oats and flax, sown on fallow.*

It is apparent from Table I. that the increases in yield at Salisbury were smaller than those obtained under the better seasonal conditions of 1937, when the increase was about 9 bushels per acre. Observations on the growth of the plots in the 1938 trials indicated that early in the season the response to the applications of zinc was quite typical. Later, however, with the continued absence of rain, the plots showed the effects of lack of moisture so badly that it was barely possible to see any difference between the various treatments. Under these climatic conditions the smaller applications of from 5 to 10 lb. per acre appear to have been as effective as the larger amounts of zinc sulphate.

*Oct plots at Longerenong 1938, showing greater height and earlier maturity of plots receiving zinc (right).*

The average results for two years 1937–38, are given in the accompanying Table II.

TABLE II.—ZINC TRIALS, LONGERENONG AND SALISBURY.

| Treatment. | Longerenong (Black Soil). | | Salisbury (Black Soil). | |
|---|---|---|---|---|
| | Yield. | Increase due to Zinc. | Yield. | Increase due to Zinc. |
| | bus. per acre | bus. per acre | bus. per acre | bus. per acre |
| No manure .. .. | 27·2 | .. | 32·2 | .. |
| Super., 1 cwt. per acre .. | 30·8 | .. | 37·8 | .. |
| Super., 1 cwt. + zinc, 10 lb. per acre* .. | 32·6 | 1·8 | .. | .. |
| Super., 1 cwt. + zinc, 20 lb. per acre* .. | 31·8 | 1·0 | 44·0 | 6·2 |

* Zinc, 15 lb. and 30 lb. used in 1937.

*Typical plants of subterranean clover from the 1938 Longerenong trials. Left, super. only; right, super. + zinc sulphate.*

Replicated trials were also conducted on the Departmental plots at Donald (Mr. H. Hancock) and Charlton (Mr. W. O'Connor) and on the properties of Messrs. Crouch Bros., Kaniva, and Mr. E. Pilgrim, Winiam. The results of these tests are given in Table III.

TABLE III.—1938 ZINC TRIALS—OTHER CENTRES IN THE WIMMERA.

| Treatment. | Kaniva (Black Soil). | Winiam (Red Sandy Loam). | Donald (Red Soil). | Charlton* (Chocolate Soil). |
|---|---|---|---|---|
| | bus. per acre | bus. per acre | bus. per acre | bus. per acre |
| No manure .. .. | 14·5 | 12·3 | 12·7 | 11·2 |
| Zinc, 10 lb. per acre .. | 14·2 | 11·0 | 12·4 | 10·8 |
| Zinc, 20 lb. per acre .. | 14·0 | 11·2 | 12·5 | 11·4 |
| Super., 1 cwt. per acre .. | 16·0 | 19·2 | 16·6 | 8·3 |
| Super., 1 cwt. + zinc, 1 lb. per acre .. .. | 18·3 | 20·2 | .. | 7·6 |
| Super., 1 cwt. + zinc, 10 lb. per acre .. | 20·5 | 19·6 | 17·3 | 7·4 |
| Super., 1 cwt. + zinc, 20 lb. per acre .. | 20·3 | 19·3 | 15·5 | 7·6 |
| Standard error .. | 0·6 | 0·6 | 0·6 | 0·5 |

* Seriously affected by drought.

To provide additional information "pilot" plots consisting of single strips of superphosphate alone, superphosphate + zinc 1 lb., superphosphate + zinc 10 lb. and superphosphate + zinc 20 lb. per acre were sown at Kaniva (Mr. E. R. Champness); Lorquon (Mr. A. C. Dufty); Dimboola (Mr. A. H. Walsgott); Horsham (Mr. W. E. Dahlenburg); Kewell North (Mr. O. P. Pietsch); Warracknabeal (Mr. R. Gould); Callawadda (Mr. A. Reading); and Donald (Mr. H. Hancock).

*Plots of subterranean clover at Salisbury showing increased growth due to the application of zinc.*

The results of the replicated trials, together with the observations made on the pilot plots, confirm the opinion that by the use of zinc, in addition to superphosphate, increased yields of wheat, when sown on fallow, may be expected on most black soils of the western and central Wimmera, but in some localities within this area, and in the eastern Wimmera generally, further investigations are necessary before definite conclusions can be drawn. With regard to the Wimmera red and loamy soils, the evidence to date is conflicting, responses having been observed in some cases, while in others no beneficial effects were recorded. In some instances the effect of zinc on the crop last year was probably masked by the adverse season which predominated throughout the wheat belt.

As zinc sulphate costs approximately 2d. per lb. it requires only a small increase in yield to warrant its use.

Replies to the questionnaire indicate that in a total of 24 cases on black ground, twenty recorded a response to zinc. On other soil types the proportion of farmers who reported increased growth was smaller, the numbers on red land being nine for, and four against, while on mixed soil four increases and two negative responses were observed.

*Flax observation plots Longerenong 1938, showing response to super. + zinc sulphate (right). The "super. only" plot is on the left.*

A point of fundamental interest in this investigation is the residual value of the zinc in subsequent years. At Longerenong College a residual stubble oat trial was sown on the site of the 1937 test. The yield results were disappointing owing to the lack of spring rains, but at no stage during the growth could any difference be observed between plots of the various treatments. Immediate application of the mineral to

stubble oat crops at the time of seeding was likewise devoid of results. It is possible that some other limiting factor to growth was operating last season in stubble-sown crops.

### *Other Districts.*

Given below are the results of the trials with zinc sulphate in other districts of the State and these show no indication of any response to zinc.

TABLE IV.—1938 ZINC TRIALS IN OTHER DISTRICTS OF VICTORIA.

| Treatment. | Werribee (Central). | Walpeup (Mallee). | Rutherglen (North-east). | Dookie (Northern). |
|---|---|---|---|---|
| | bus. per acre | bus. per acre | bus. per acre | bus. per acre |
| Super., 1 cwt. per acre .. | 20·9 | 15·9 | 26·1 | 25·2 |
| Super., 1 cwt. + zinc, 20 lb. per acre .. | 19·2 | 16·1 | 25·8 | 24·7 |

### *Preliminary Trials on Other Crops.*

The trials conducted at Salisbury and Longerenong last year also included preliminary investigations on many related points of interest. Plots were sown with coarse crystals in comparison with an equivalent amount of fine crystals; various different compounds of zinc, including zinc oxide and zinc chloride, were tried. Further work, however, must be conducted before definite conclusions can be obtained on these points.

The most interesting of this series of tests were those in which applications of zinc in addition to superphosphate had been made to plots of oats, peas, subterranean clover, and flax, when sown on fallow. The effect of zinc on these crops was even more outstanding than in the case of wheat. Even at Longerenong, where the response of wheat has not been great under the most favorable climatic conditions, the difference in growth of the oat, flax and clover plots was remarkable. Increased height, growth and depth of colour were again noticed. The discovery that clovers and possibly other pasture plants will respond to applications of zinc may be of the greatest importance in the development of pastures in the Wimmera, and the Department, in addition to further work with wheat, will pay considerable attention to this aspect of the work this year.

The investigations as to the minor elements other than zinc which were conducted throughout Victoria last year, have given no evidence so far that other deficiency areas occur within the wheat belt of the State. In the Wimmera, however, there is evidence to show that applications of other elements may also play their part in determining the best mineral mixture for this district.

# *Wireless Talks for Farmers*

WITH the co-operation of the Australian Broadcasting Commission, the Victorian Department of Agriculture is conducting a series of wireless talks on subjects of particular interest to the man on the land. These talks are being broadcast from the regional stations, 2CO (Corowa), 3GI (Gippsland), and 3WV (Horsham) on Friday evenings, the 15-minute sessions commencing at 7.40 p.m.

The next talks will be on 14th April and 28th April.

In order that these talks might be of maximum value to the farming community the Department is anxious to have the co-operation of listeners, who are invited to submit questions they would like answered over the air. If you have any particular problem connected with the management of your farm, your crops, or your live stock, or with the marketing of your produce, send a letter to Mr. J. Keane, B.Agr.Sc., Department of Agriculture, Melbourne. Your problem will then be submitted to expert officers of the Department, whose advice will be given. If you do not desire your name broadcast use initials or a nom-de-plume, but do not omit to mention your district.

# *All-Australian Export Lamb Competition*

## *November Judging*

THE following report on entries in the All-Australian Export Lamb Competition for November, which were judged at the Central Markets, Smithfield, London, on 7th February, 1939, by Mr. J. I. Hamilton, has been received from the Australian Meat Board's London Office.

Twenty-one pens of five carcasses each were entered. The placings were as follows :—

| Placing. | Entrant. | State. | Remarks. |
|---|---|---|---|
| CLASS I.—16 ENTRIES.—Lambs sired by Southdown, Dorset Down, Hampshire Down, or Shropshire Rams. | | | |
| 1st .. | R. B. Mills & Son, "Clifton", Nullawil | Victoria .. | Southdown x English Leicester–Comeback. A pen of five very well shaped carcasses of true Down type, fairly well finished but shallow in the crutch. |
| 2nd .. | Robert B. Clapp, "Warrawee", Brookstead. | Queensland | Southdown, Romney Marsh x Merino. A pen of well balanced carcasses of Down type, but not outstanding. |
| 3rd .. | H. H. Shillabeer, Oakbank | Sth. Aust. | Southdown, English Leicester Merino. Three very good lambs and two particularly shallow in crutch. |
| CLASS II.—3 ENTRIES.—Lambs sired by Ryeland, Suffolk, or Dorset Horn Rams. | | | |
| .. | W. J. Trevor Clarke, Mt. Schanck, via Mt. Gambier (3 entries equal) | Victoria .. | Ryeland, Lincoln Merino. Poor conformation and over-fat on trunk. |
| CLASS III.—2 ENTRIES.—Lambs sired by Lincoln, English Leicester, Border Leicester, or Romney Marsh Rams. | | | |
| .. | H. H. Shillabeer, Oakbank (2 entries equal) | Sth. Aust. | English Leicester, English Leicester Merino. Two pens of good lean commercial carcasses but lacked the attractive conformation of Class I. |

This was the first occasion on which representative pens from each State of the Commonwealth were entered. After judging they were well displayed and attracted considerable interest, very favorable comments being made by all sections of the trade.

The standard of this Competition, however, was lower than previously, which is well indicated by the points awarded.

Messrs. R. B. Mills & Son, Victoria, are to be congratulated on securing first place, especially in view of the fact that this entry is the only one from the State of Victoria in Class I. Mr. R. B. Clapp's Queensland entry was a close second with a pen of very handy weight lambs.

Apart from the first three pens there was nothing outstanding in Class I. to warrant commendation, other than that the whole show was a good commercial lot of lambs most suitable for the requirements of the United Kingdom trade. The New South Wales entries were disappointing, and compared unfavorably with the remainder of the entries. South Australia once again contributed the largest number, with six entries, and Queensland with three entries made a good showing. The Queensland lambs were lighter in weight than the majority. The two entries from Western Australia were only fair and not up to the standard of quality expected from that State. Tasmania's one entry was a useful pen. Class II. entries from Victoria were very ordinary carcasses.

32
& PAINE.
33
HAYES & PAINE

# Tomato Culture

*By Basil P. Krone, Fruit Packing Instructor*

*The first portion of this article on Tomato Culture appeared in the February issue of this Journal and dealt with suitable soils, drainage, the sowing of the seed and the construction of the hot-bed and cold frame.*

THE cold frame is similar in construction to the hot-bed, but is without bottom heat. It is necessary, however, that the soil for this frame and/or trays be a very fertile one. A fertile soil can be artificially made by mixing together three parts of ordinary garden loam, two parts of very old pulverized cow manure, or sheep manure for preference, and one part of sand.

Both the hot-bed and the cold frame are in reality miniature glasshouses, and, therefore, should be treated as such. This means that temperature, ventilation, and evenness of soil moisture should receive constant attention.

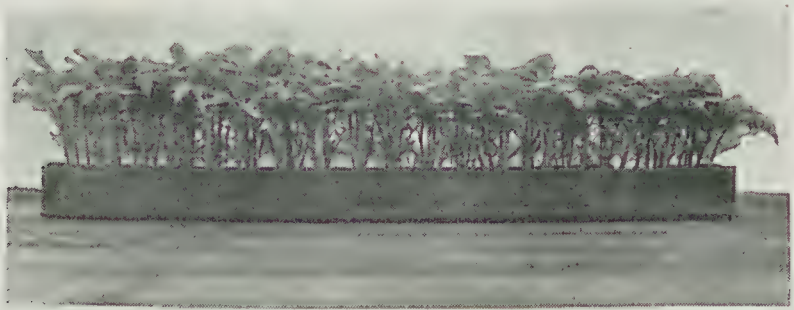
Ample ventilation must be provided at all times without admitting draughts or cold winds. The glass should be well raised on sunny days. Lack of ventilation and excessive watering will quickly cause "damping off" or overdrawn seedlings.

The best guide is a thermometer, the temperature being kept as near as possible between 65° and 72° F. Serious harm, however, will not occur in a cold frame should the temperature occasionally fall as low as 50° F., which it might do for a few hours on a cold night. In the hot-bed high temperatures are detrimental in the cold weather, but are not so harmful as warmer weather approaches. The temperature can be kept fairly uniform if the glass is raised or lowered according to the vagaries of the weather.

Covering the frames each night is a very important factor. Failure to do this on a frosty night will convert the frame into a veritable ice box and destroy the plants, also continual watering with very cold water in the winter time on soil which is already damp is decidedly detrimental. In the writer's opinion, seed beds or trays should be allowed to appear as though they were commencing to dry out but not actually dried out, before applying water, and in the *cold weather*, if cold tap water is to be used, better results are obtained if the watering is given in the late morning rather than the evening. On the other hand where evening watering is desirable tepid water not warmer than 100° F. is satisfactory. In fact, tests have proved that, where plants are raised early in the season without a glasshouse, they are several days earlier when watered with tepid water all the time, than when cold water is used. The ordinary watering-can with a coarse nozzle is not suitable for seedling tomato plants. Seedlings require a fine misty spray and special cans can be procured for this purpose.

### *Seedlings and Trays.*

As previously explained, the seedlings should be pricked out 2 to 3 inches apart, from where they have been sown, into other trays, or a cold frame, before the first pair of rough leaves appear This work usually takes place a fortnight to three weeks, according to temperature, &c., after sowing the seed.



*A tray of healthy tomato seedlings grown and pricked out as described.*

Some growers do not prick out their seedlings. They simply pluck up handfuls of the young plants later and "heel" them in for a few days to harden off just prior to planting. This is not a good method, because not only do the plants receive a severe check, but also large numbers become overdrawn through growing

so closely together. The extra work of pricking out will be amply repaid by the sturdy class of plant that is obtained.

During the months of August–September the outside temperatures fluctuate between 45° F. on cold nights to 120° F. in selected sunny positions in the day time, and tests have shown that seeds sown in trays or cold frames during this period require approximately ten days, according to the variety, to germinate, while where the temperatures are controlled, say in a glasshouse with a minimum of 60° F. and a maximum of 75° F., the seeds require only five to seven days to germinate. Later, and when the plants are in the field, they appear to thrive better when night temperatures do not fall below 60° F., and the day temperatures are around 80° to 90° F., but, of course, these congenial conditions do not occur until later in the year.

In the trade, trays of uniform size are used, and where thousands of seedlings have to be handled, the " pricking out " is done only a trifle closer than that recommended in the chapter relating to this work. Trays in two sizes are used ; the larger are 28 inches long, overall, by 14 inches wide inside and 3 inches deep inside, with a partition across the centre. These accomodate 200 plants. The smaller tray, which accommodates 100 plants, is half the size, namely 28 x 7 x 3 inches with a partition.

### *Planting Out—Staking.*

The little plants should be planted out any time after they have made their eighth leaf, but preferably just before the tenth leaf appears.

*A tomato planting machine at work in the Eurobin district.*

The period from the time the seed is sown to this stage will vary from six to eight weeks according to temperature and growing conditions.

After the tenth leaf has formed most varieties produce the first set of flowers, then five leaves and another set of flowers, then three leaves and

*Three machines at work, each planting 15,000 plants per day.*

*Planted in rows 4 ft. apart and 18 inches between the plants (7,240 plants per acre), the above crop yielded 825 cases of tomatoes per acre. Each plant averaged 25 marketable tomatoes.*

a set of flowers alternately, during the life of the plant. There are very few exceptions to this rule. Those which differ have what is known as a determinate habit of growth. They are sometimes called " self-pruners " because they produce a set of flowers between each leaf stem and terminate with a set of flowers instead of a lateral growth. A variety with these characteristics was produced in 1931 or 1932 by Dr. O. H. Pearson, formerly of the Californian Agricultural Experimental Station, and named after him. Another American variety named Penn State also has these characteristics.

Planting-out time is a critical stage in the life of the tomato plant. It is most important that favorable weather conditions accompany the work. Should cold winds prevail, the grower will achieve better results if he delays the planting until a more favorable time, even if he has to wait until the little plants are forming the first set of flowers.

Plant the young plants deeply; to the first pair of leaves is recommended. If the plants are to be grown in the bush form, dwarf varieties such as Burwood Wonder, or the South Australian Dwarf may be planted from 18 inches to 2 ft. 6 in. between the plants and 4 ft. 6 in. to 5 feet between the rows. Other varieties (not cluster types) should be planted from 2 ft. 6 in. to 3 feet between the plants and 5 or 6 feet between the rows.

Cluster types, also other varieties which are to be staked, may be planted from 1 foot to 15 inches apart and 4 ft. 6 in., or 5 feet between the rows. A good method of staking is to plant two plants about 6 inches apart with a stake between them, leaving a slightly larger space, say, 18 inches before planting the next two plants. This method reduces gaps in the row should a plant die from disease.

*Tomato plants trained on binder twine and wire trellis.*

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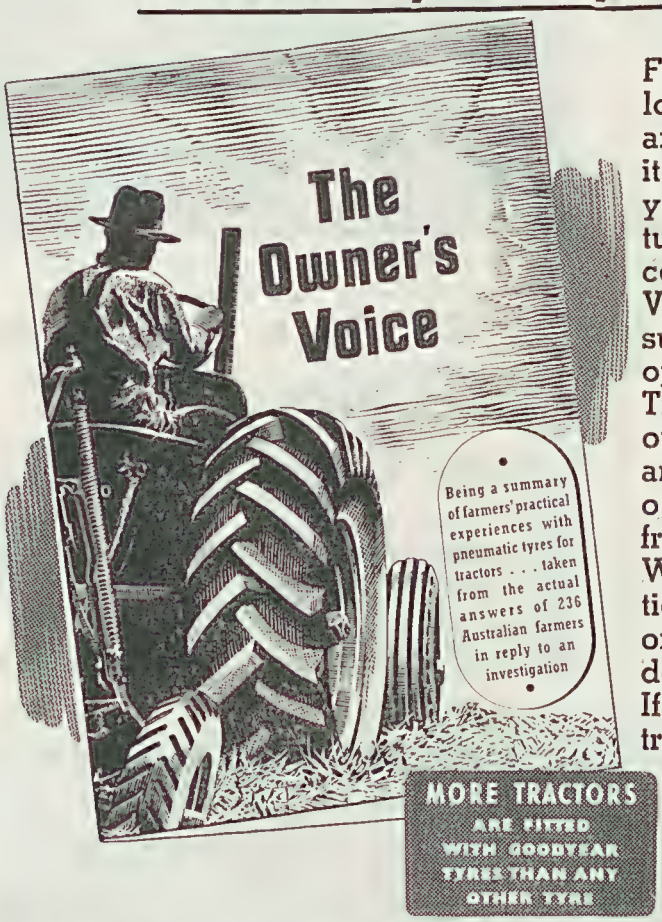
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Another satisfactory method which is becoming more popular is to strain two fencing wires, one about 6 inches and the other about 5 feet from the ground, the whole length of the row between two heavy strainer posts. Stability between the two wires is maintained by driving light wooden droppers into the ground at intervals and fixing the wires to them. Hayband is then tied or wound up and down between the wires, and the plants trained to this instead of wooden stakes. At the end of the season the haybands are simply cut, the old plants pulled out, heaped up and burnt. This system is claimed to be more economical than the usual method of staking. In all instances the distance between the rows is decided by the ultimate size of the variety, ample space being left for cultivating implements to pass through.

Losses at planting time are sometimes due to obscure causes, therefore, the following recommendations are made :—

(*a*) Always wash the hands before handling young tomato plants if artificial fertilizers (particularly superphosphate) have been previously handled. Artificial fertilizers must not come in direct contact with any part of the plant; not even the roots at planting time. This will be dealt with later.

(*b*) Do not allow the foliage of the small plants to become wet while planting out. Do not dip the foliage in water or other solution. The young plants should be certainly watered in, but the rose of the watering-can should be directed to the sides of each plant and not over the top of them. Moisture-laden leaves in uncongenial weather fall flat to the ground and stay there for so long that before the plant has time to recover from the shock of transplanting, normal functioning of the leaf ceases, and results in either a weak plant or its complete collapse.

(*c*) A well prepared soil in a nicely compacted seed bed should be the future home of the young tomato plant. An insufficiently compacted soil, or seed bed, is frequently the cause of many failures. The land should be prepared months ahead.

### *Irrigation.*

Over-irrigation ruins the quality of tomatoes. An attempt should be made to maintain evenness of moisture and good physical condition of the soil by judicious watering and generous cultivation.

Cultivation should follow every irrigation, but care should be taken not to cultivate too deeply close to the plants, otherwise more harm than good will occur through injury to the feeding roots. To achieve this objective the grower should regulate the frequency of the irrigations according to local conditions, such as annual rainfall and the type of soil, &c. Irrigations should be used only to prevent the plants from wilting; but at the same time the conditions should be such that they are kept steadily growing. Tomatoes like moisture, but there is a difference between a moist soil and a wet soil;

*Showing method of banking for irrigation and frost protection. The frost boards have been removed and a cultivation is being given after an irrigation.*

[*Continued on page 199.*

# Irrigated Pasture Competition

## Rochester Pastures Withstand Dry Season

*Report of the Judge, E. T. Beruldsen, B.Sc. (Agric.), Senior Irrigation Officer*

IT is a wonderful tribute to the quality of the irrigated pastures in the Rochester district, that in a season of very restricted water supply, there should be surprisingly good growth, and not much evidence of the pastures being irremediably damaged by the abnormally dry conditions. This high quality reflects the good cultural practices generally adopted in the district during recent years, particularly in regard to the building up of the fertility of the soil by liberal applications of superphosphate. Also, good grazing methods have permitted the pasture plants to make stronger root establishment and root storage, and by the retention of a proper cover on the surface of the ground large accumulations of organic matter or humus have occurred. This organic matter minimizes the surface cracking, preventing rapid evaporation of moisture, and coincidentally increases the water holding capcity of the surface soil.

Observations made during the second inspection of the pastures in February tended to confirm results obtained from certain experiments which have been conducted at the State Research Farm, Werribee, during the past few years. Anticipating that in some abnormally dry season there might be a shortage of irrigation water, and having no absolute evidence as to what the reaction of a pasture of mixed grasses and clovers would be to such conditions, it was decided early in 1933 to superimpose replicated watering trials on manurial test plots which had been established some years previously, and one of the watering treatments involved the deliberate withholding of water from the pasture for over three months in the middle of summer each year.

*A Rochester settler's home.*

Although aware of the resilience of such pastures under fairly dry conditions, in contradiction to the popularly expressed opinion that if the pastures were not watered very frequently they would die out, it was considered that under the proposed treatment most of the white clover and some of the perennial grasses would die out and be replaced by subterranean clover, other annual clovers and annual grasses. The results have demonstrated that when pasture of mixed grasses and clovers has been well treated in respect of manure the good perennial species will persist through a prolonged dry period, and when good conditions in respect of moisture supervene, will be quickly rehabilitated, and even white clover will constitute a large proportion of the pasture sward. This is in marked contrast to what occured when either no manure or insufficient manure had been applied.

The results for the 1937–38 season are shown in the accompanying table. During this season the test plots were mowed with a motor lawn mower, and botanical analyses

*Pasture hay conserved on the property of Mr. D. Holman.*

on a productivity basis were carried out immediately prior to each cut. A manurial treatment of at least 2 cwt. superphosphate per acre was required to ensure the persistence of the most valuable species, while to obtain the best production with what moisture was available, 4 cwt. super. per acre was necessary. The results demonstrate clearly that, although it is recognized that the more water is applied to irrigated pastures, the more super. should be applied to take advantage of the extra irrigation, superphosphate can increase the efficiency of what moisture is available when irrigation water is restricted.

Another important fact arising from this experiment, was that after a few years the white clover on the plots watered "Spring and Autumn" appeared to be of a more robust and vigorous type than that present on the plots which were regularly watered throughout the summer. Apparently the weaker and less productive strains of white clover had succumbed to the harsh treatment, and when good conditions supervened the robust plants which remained had become aggressive and spread rapidly. From this it is deduced that as a result of the drastic restrictions in water supply in many districts during the present season, pastures which have had good treatment as regards manure in previous seasons may eventually become populated with the more vigorous strains of white clover and other pasture species when normal conditions return. There is no doubt that it was by some such process of natural selection that the various district strains of "irrigation wild white" clover evolved.

It is in a season such as the one we have just experienced, that valuable information can be obtained regarding the relative productivity of various pasture species and strains of these species under comparatively dry conditions. In the Rochester district, there are a considerable number

*Some members of Mr. D. Holman's herd grazing on paspalum and white clover pasture.*

of pastures of the "self-sown" type, mainly composed of *Paspalum dilatatum* and wild white and/or strawberry clovers. There was no doubt that under the dry conditions obtaining at the time of the second inspection such pastures were more productive and in better heart than those which had been sown down with the conventional mixture. Next to lucerne, *Paspalum dilatatum* was perhaps the most productive species under the conditions obtaining. Cocksfoot also demonstrated its adaptability to poor conditions, and reference to the table already mentioned will corroborate this finding. Perennial rye-grass though not growing actively like Paspalum or cocksfoot was not dead even in the driest pastures, and eventually will demonstrate its resilient characteristics.

This season has demonstrated the value of reserving a reasonable proportion of the farm for lucerne whenever possible. During this season, farmers who have had a fair proportion of their

MANURIAL TESTS WITH SUPERIMPOSED WATERING TREATMENTS—SEASON 1937–38.

| Manurial treatment per acre. | Watered Spring and Autumn. (No waterings between 17·11·37 and 1·3·38.) | | | | | | |
|---|---|---|---|---|---|---|---|
| | Yield. Lb. Dry Matter per 1/66 ac. | Percentage of Dry Matter produced by each species. | | | | | |
| | | Rye-grass. | Cocksfoot. | Miscellaneous Grasses. | White and Strawberry Clover. | Subterranean Clover. | Weeds. |
| | | % | % | % | % | % | % |
| No manure .. .. .. | 40·7 | 5·7 | 62·8 | 7·8 | 4·5 | 17·4 | 1·8 |
| Super. 1 cwt. .. .. | 70·5 | 4·0 | 54·7 | 2·4 | 28·9 | 9·1 | 0·9 |
| Super. 2 cwt. .. .. | 89·8 | 4·4 | 48·2 | 3·2 | 43·5 | 0·2 | 0·5 |
| Super. 4 cwt. .. .. | 100·9 | 4·0 | 51·8 | 3·3 | 40·1 | 0·8 | trace |

N.B.—1937–38 was the fourth successive season in which water had been withheld from these plots during the summer. Miscellaneous Grasses consists of inferior species *Danthonia spp.*, *Setaria spp.*, and *Bromus mollis*.) on the "No Manure" and "Super. 1 cwt." plots; while on the "Super. 2 cwt." and "Super. 4 cwt." plots Prairie grass, a valuable species, constitutes most of the "Miscellaneous Grasses".

*Ample fodder reserves are a feature on the property of Mr. E. Watson, Nanneella.*

holdings under lucerne have suffered least from the water restrictions. In good seasons, lucerne lends itself most admirably to conservation purposes, although since it is very susceptible to injury by excess water or by the grazing animal, it is less persistent than mixed pasture, and does not equal the latter as a grazing medium.

Pastures which had been consistently over-grazed in the past have suffered most severely during the present season, since the over-grazing had prevented the development of that density of sward and accumulation of organic material which effects such an economy in the use of available moisture. Of course, during the present season irrigation farmers have been compelled to take advantage of any feed offering, and under such conditions the pastures have been grazed harder than normally would have been the case.

Under normal conditions, the pasture should be grazed not longer than for a few days in each month, and a recuperation period of at least three weeks is necessary to ensure that the plants will retain their vigour, and at the same time attain a composition which is well-balanced in respect of the fodder constituents. This does not imply too lenient grazing of the pasture while the stock are depastured on it, but by adequate sub-division and proper regulation of the stocking it should be possible to eat the pasture off fairly uniformly and prevent an over abundant production of rank tussocky growth while not grazing to an extreme. Not a few farmers in the Rochester district have proved that this system has benefited not only the production from the pastures but also the health of the stock.

Dairy farmers in the district have been surprised by the nutritive value of the feed as it dries on the pasture. One farmer proved that although his milk returns had dropped 20 per cent. owing to the dry conditions, his butter-fat production had dropped only 5 per cent. Up till then he had not had to resort to hand feeding to supplement the pastures. At Werribee, the dry feed on pastures which have not been irrigated since the end of October was still maintaining three sheep per acre at the end of February.

Another factor well worth noting was that the excellent lay-out for irrigation generally found in this district had been responsible for a sound economy in the use of water. It was interesting to find that when careful attention was paid to the irrigation, the good lay-out was responsible for a much larger area of pasture being irrigated with a limited supply of water than would have been thought possible. This emphasizes the need for more careful grading to ensure even distribution of water in districts where such a high standard of efficiency has not been reached as yet.

## *The Awards.*

For the third year in succession Mr. H. A. Schier won the competition with a paddock of 7 acres, originally sown with 8 lb. Hawke's Bay perennial rye-grass, 3 lb. cocksfoot, and 1 lb. each of New Zealand wild white clover, White Dutch clover, alsike clover, and lucerne. At seeding 1 bag of super. per acre was used, the following season 2 bags, and during the last two seasons 3 bags per acre have been applied each season. As in previous years the dominant grass species was rye-grass, but now cocksfoot seems to be becoming more prominent. There is a wonderful balance of the grass and clover, and a dense sward has developed with very few weeds. The paddock is well graded and drained, and very uniform in growth. The supply channel is inclined to grow "nut-grass" (*Cyperus vegetus*—Umbrella sedge) but had been kept fairly free of this weed, which is common to most irrigation farms in the district. At both inspections the pasture was in excellent condition. At the February inspection Mr. Schier was in the fortunate position of having been able to give the pasture an irrigation a week before. The pasture had been watered at three-weekly intervals prior to this watering and this contrasted to a marked degree with the much more frequent irrigation carried out in previous years.

Despite the dry season Mr. Schier had applied another bag of super. per acre in January this year, and there is no doubt that he will reap the benefit of such generous treatment later on in the season.

Mr. Schier is convinced that to graze a pasture too often is detrimental to the sward, and during the last two seasons has adopted approximately a monthly rotation. The dairy herd gets first preference and occasionally the paddock is "cleaned up" with sheep. This cleaning up process, however, is never too drastic and as a result the sward has become dense and protects the surface soil from too rapid evaporation of the moisture. During this season the paddock has carried 70 dairy cattle for 3 days every 3 weeks—a wonderful testimony to the carrying capacity of well treated irrigated pasture.

Second place was gained by Mr. J. Huon, who competed for the first time. This paddock of 3 acres was sown 12 years ago to lucerne. When the lucerne thinned out, the paddock was scarified and sown with 8 lb. Hawke's Bay perennial rye-grass, 3 lb. cocksfoot, and 4 lb. New Zealand certified white clover. At the time this white clover seed was 10s. 6d. per lb., but Mr. Huon has never regretted getting a superior white clover strain. The paddock was in beautiful condition in the spring, but owing to the shortage of water had dried up considerably at the inspection in February. An excellent balance of grass and clover was present, and cocksfoot was well in evidence. Mr. Huon considers cocksfoot superior to any other grass for irrigation conditions and summer growth, and has experimented in other paddocks with various strains of this grass. He finds cocksfoot seed from old established pastures in the district superior to any other.

The lay-out for irrigation is excellent, the supply channel being concrete lined, with pipe outlets to the bays, and drainage is provided for. Two bags of super. per acre are applied each year to the pasture, one being given in March, the other in September.

Most of this farm of 42 acres is under excellent pasture; 37 acres are irrigable, and on this small area last year 35 head of stock, including horses, were carried, and in addition 430 sheep from September, 1937, to June, 1938. In June, 230

ROCHESTER PASTURE COMPETITION, 1938–39.

*Details of Award* (2 *inspections*).

| Exhibitor. | Lay-out for irrigation and condition of channels. | Condition of pasture. | Uniformity. | Mixture. | Freedom from Weeds. | Total. | Grand Total. |
|---|---|---|---|---|---|---|---|
| **Possible Points** .. .. .. | 20 | 20 | 20 | 20 | 20 | 100 | 200 |
| 1. H. A. Schier .. .. | 18 | 18 | 19 | 19 | 19 | 93 | 184 |
| | 18 | 18 | 18 | 19 | 18 | 91 | |
| 2. J. Huon .. .. .. | 19 | 19 | 18 | 19 | 19 | 94 | 182 |
| | 19 | 16 | 17 | 18 | 18 | 88 | |
| 3. D. Holman .. .. | 18 | 19 | 18 | 17 | 19 | 91 | 180 |
| | 18 | 18 | 17 | 17 | 19 | 89 | |
| 4. D. Fehring .. .. | 18 | 18 | 19 | 18 | 18 | 91 | 179 |
| | 18 | 17 | 18 | 18 | 17 | 88 | |
| E. Watson (A) .. .. | 17 | 19 | 18 | 19 | 19 | 92 | 179 |
| | 18 | 18 | 16 | 18 | 17 | 87 | |
| „ „ (B) .. .. | 17 | 19 | 18 | 17 | 20 | 91 | 179 |
| | 17 | 18 | 17 | 17 | 19 | 88 | |
| 5. J. J. Desmond (C) .. | 17 | 17 | 18 | 17 | 19 | 88 | 172 |
| | 17 | 15 | 18 | 17 | 17 | 84 | |
| 6. „ „ (B) .. | 17 | 16 | 19 | 19 | 19 | 90 | 171 |
| | 17 | 14 | 17 | 17 | 16 | 81 | |
| 7. „ „ (A) .. | 17 | 17 | 18 | 18 | 18 | 88 | 170 |
| | 17 | 15 | 17 | 17 | 16 | 82 | |
| 8. Firth Bros. .. .. | 17 | 18 | 17 | 19 | 17 | 88 | 169 |
| | 17 | 14 | 16 | 18 | 16 | 81 | |
| 9. S. E. Paynter (A) .. | 18 | 17 | 17 | 18 | 18 | 88 | 167 |
| | 18 | 14 | 15 | 16 | 16 | 79 | |
| 10. „ „ (B) .. .. | 17 | 16 | 15 | 17 | 17 | 82 | 156 |
| | 17 | 12 | 15 | 14 | 16 | 74 | |

NOTE.—Award for spring inspection given first in each case.

which were on the farm for agistment were removed. The pastures are established on good soil, and are well treated. They are never grazed too severely or too often.

Mr. D. Holman exhibited a paddock of 8 acres adjacent to the one which scored so well in the competition last year. This pasture was also of the "self-sown" type, the paddock having been last ploughed and graded in 1920. It was in lucerne for a number of years, and as the lucerne thinned out *Paspalum dilatatum* and wild white clover intruded. By 1930 almost all the lucerne had died out. By consistent top-dressing (2 bags super. per acre applied each autumn) this and other pastures on Mr. Holman's property have developed into highly productive areas. Over one cow per acre is carried on this farm and each year sufficient fodder is conserved for hand feeding during the winter months. Although the pasture had been watered at intervals of three weeks this season instead of normally every 10 days to a fortnight, it was in fresh growing condition at the inspection in February, and from this respect compared favorably with pastures sown down with the usual mixture.

Perennial rye-grass and prairie grass are rapidly coming into this pasture as volunteer species, and should rapidly eliminate any disability this pasture may have had in the past through consisting solely of summer growing species such as paspalum and white clover. The intrusion of these species is an indication of a gradual raising of the fertility level.

Mr. E. Watson, of Nanneella, again exhibited two pastures of exceptional merit. Mr. D. Fehring, a new competitor, entered a very fine exhibit. In fact, very few points separated the first six pastures on the list, and the judge's task was rendered rather difficult accordingly.

It is very gratifying to record a further improvement in the number of entries, especially as this particular competition has been in operation for a good number of years. Apparently, there is no sign of flagging interest, and the high standard of all the exhibits reflects the continued progressive development along sound lines in the district.

## *School Plots.*

A general improvement in the care and attention paid to the school plots was a very pleasing feature of the competition this year. Ballendella School had made great progress, and the energy of the head teacher, Mr. Weppner, and the industry and keen interest of the pupils deserved that these plots should gain the honours. In the first place the plots had been increased to 21, and the fence enclosure had been extended correspondingly and renovated. The paths had been freshly gravelled and levelled almost to the tops of the boxes. This ensured better economy in watering the boxes, as well as improving the general appearance. The labels had

*A view of the school plots at Ballendella.*

ROCHESTER SCHOOL PASTURE PLOTS.—1938–39.

*Details of Award (2 inspections.)*

| School. | Surroundings, Paths, &c. | Condition. | Labels. | Number of Species. | Freedom from weeds. | Total. | Grand Total. |
|---|---|---|---|---|---|---|---|
| **Possible points** .. .. .. | **20** | **20** | **20** | **20** | **20** | **100** | **200** |
| Ballendella .. .. .. | 20 | 19 | 20 | 19 | 20 | 98 | 194 |
| | 20 | 18 | 20 | 18 | 20 | 96 | |
| Nanneella Estate .. .. | 20 | 19 | 19 | 18 | 20 | 96 | 189 |
| | 20 | 17 | 19 | 17 | 20 | 93 | |
| Strathallan .. .. .. | 18 | 18 | 17 | 16 | 19 | 88 | 159 |
| | 15 | 14 | 15 | 12 | 15 | 71 | |
| Nanneella West .. .. | 18 | 16 | 17 | 17 | 18 | 86 | |
| | Withdrawn at February inspection. | | | | | | |

NOTE.—Award for spring inspection given first in each case.

been repainted and the names of the species painted exceptionally neatly. In addition to the common names of the species, the true botanical names were inscribed. Both boxes and paths were entirely free of weeds, and quite a number of the plots had been resown a few weeks prior to the first inspection. All the plots presented a fresh green appearance at both inspections and were at the proper stage for judging, neither too short nor too long. Mr. Weppner's care and attention had ensured that the plots did not deteriorate during the long summer vacation, which ended shortly before the second inspection.

*Another view of the Ballendella plots.*

Nanneella Estate School which won the competition last year also had made progress, but not to the extent of Ballendella. Mr. Lee, the head teacher, has always taken a keen interest in this work, and the very fine exhibit reflected great credit on his work and that of the scholars. At each inspection the plots were in beautiful condition and entirely free from weeds. At the February inspection the plots had suffered very slightly from the abnormally hot dry conditions.

Strathallan School, which always has suffered a disadvantage regarding soil and water supply, had a very creditable show. The erection of a brushwood shelter by Mr. McLeay, the teacher, was responsible for saving the clovers and grasses from almost complete extinction during the summer vacation. Fresh gravel had been put on the paths, and adjacent plots had been worked up very nicely for the growing of vegetables, and a nursery for young trees constructed.

Nanneella West plots scored well in the spring inspection, but having suffered severely from lack of water during the summer vacation were withdrawn from the competition, at the inspection in February.

In conclusion, it may be stated that a large number of plots is not an essential to winning such a competition. From the award it will be noted that in this regard Ballendella scored only one point more than Nanneella Estate at each inspection, although Ballendella had four more plots. A reasonable number of plots having been laid down, due regard is paid to the manner in which the greatest advantage has been taken of the number available.

# Book Review

***The Law Somner Pasture Book.***

This book gives a wealth of information on the cultivation of grasses, clovers, and other pasture plants. It also includes a comprehensive list of trees suitable for avenues and shelters, and of those which would be useful for stock in drought periods, and there is an illustrated section devoted to weeds and their control. Copies may be obtained free on application to Law Somner Pty. Ltd., 21–23 Elizabeth-street, Melbourne, C.1.

# Echuca Fodder Conservation Competition, 1939

*Report of the Judge, E. T. Beruldsen, B.Sc. (Agric.) Senior Irrigation Officer*

THE quantity and quality of the fodder reserves exhibited in the Echuca Fodder Conservation competition constituted a wonderful tribute to the value of even a restricted supply of irrigation water in an abnormally dry season. Regarding quantity, three of the nine competitors had the necessary requirements as outlined in the conditions of this competition, and this was a very high standard for a drought year. The other competitors did not fall far short of the standard. That so little of the fodder exhibited left little to be desired in the matter of quality was to some extent a reflection of the continuously dry weather which had been experienced, no discolouration of the hay having occurred through rain.

All the competitors had a water right which extended over at least half of their properties, which varied in size from 35 acres to over 800 acres. The district is served by the Goulburn storages, and as this storage system had failed to meet requirements generally, scarcely one had been able to obtain more than half of the water that would be used in a normal season. The amount of water supplied up to the middle of February varied from 50 per cent. to 85 per cent. of the water rights, while, in the previous season, each competitor had used more than his water right by the same time. It was, therefore, all the more remarkable to find that, out of over 800 tons of fodder inspected during the competition, less than 50 tons was fodder which had been carried over from previous seasons. Approximately 95 per cent. of the fodder had been conserved in one of the driest years on record.

Nearly two-thirds of the total fodder conserved had been harvested from permanent lucerne or pasture paddocks and only one-third was cereal hay. Most of the cereal crop conserved had been from ground which had had at least one irrigation. In some instances a proportion of the cereal hay was from unirrigated ground, but the crops had been too short for the binder, and had been cut with the mower, raked into heaps and pressed into bales in the paddock. This short, fine-strawed type of oaten or wheaten hay was of a highly nutritious character, containing an unusually large percentage of grain. Of course, in a normal season this type of fodder would not be available, and the percentage of cereal hay as compared with that of lucerne or pasture hay would have been even less. This is a testimony to the fact that the latter type of hay costs less to produce and, at the same time, is more nutritious and a better balanced ration for stock.

The method of pressing loose hay into bales in the field might possibly be extended to facilitate the handling of meadow hay. Although good clover and grass hay is undeniably the ideal fodder for supplementary feeding of stock since it is very nutritious and palatable and less waste occurs than in the feeding out of lucerne hay, it is rather difficult to handle. In this competition only 150 tons out of 800 tons was meadow hay. Of course if water supply had been better there would have been more pasture paddocks left out for cutting in the spring, but the fact remains that most farmers prefer to handle lucerne hay. The use of sweeps, some types of which can be easily constructed on the farm, will expedite the collecting of the hay, sometimes straight from the windrow, and the amount of forking will be minimized. Home-made horse forks at the stack-yard, slings, &c., are being utilized more and more to handle meadow hay, and there is no doubt that the saving in time and labour and the better chance of getting the hay in in good order will soon repay the cost of construction or installation.

For a long time dairy farmers have valued meadow hay for the winter feeding of milking cows, but sheep farmers and fat lamb producers have not been so appreciative. Experience in the supplementary feeding of sheep on irrigated pastures at the Werribee Research Farm has shown that meadow hay is superior to other types of fodder for this purpose. Although the grazing test plots have never been overstocked, and ample pasturage has been always offering, it has been found that ewes in lamb would eat about two-thirds of a pound of meadow hay per head per day. They endeavoured to balance their diet, which otherwise would have consisted of short, over-rich succulent green herbage. Supplementary feeding is commenced half way through pregnancy and is continued for three or four weeks after lambing. Tests have shown that the ewes which had this supplement secreted more milk, and that the lambs matured more rapidly. In these tests care was exercised that

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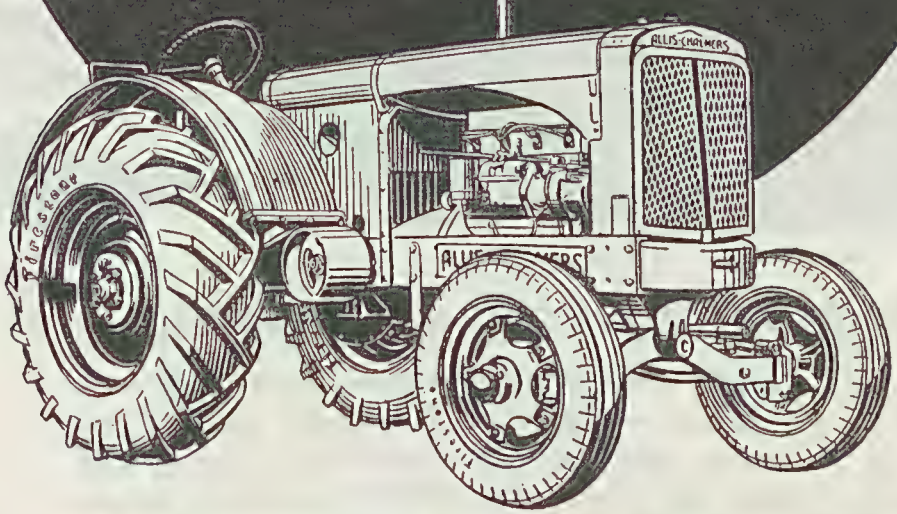


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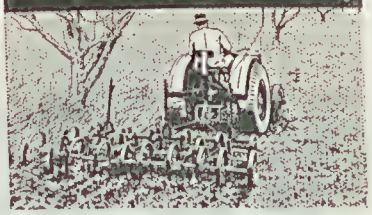

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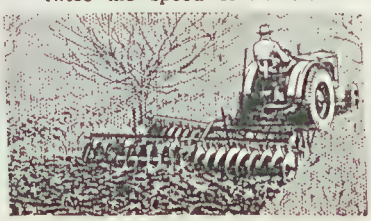

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*The well-filled stackyard of Mr. A. W. Rowley, Koyuga.*

the sheep which were supplementary fed and those which were not both had access to ample pasturage. Another interesting and valuable fact arose from these tests, in that the incidence of a disease commonly known as "twin lamb disease" or pregnancy toxaemia was minimized where the supplement was supplied. Feeding out was easily and economically carried out by putting the hay into racks simply constructed of odd pieces of wire fencing material. These were made to serve two paddocks by fixing the racks on the fence between them.

Very little grain had been reserved for feed, and apparently all the competitors appreciated that although this type of fodder takes less storage space and is less bulky to handle in feeding out, it is generally a more costly method of hand feeding. At the same time, the composition of most grains is not the ideal balanced ration for ruminants, and cattle and sheep would require a considerable amount of roughage in addition to the grain.

It was disappointing to find that no silage had been conserved on any of the farms. Its value in supplying succulent fodder in a dry season such as this has been, would have surpassed its intrinsic value as a fodder. A trench silo is not very difficult or costly to construct, and if the silage is well made there is very little waste. It is safe from pests, fire and flood, and will keep almost indefinitely. Hay and grain can be sold very easily, and often one finds that farmers deplete such fodder reserves to a dangerous extent, to the detriment of their own stock. On the other hand, silage is not easily marketable, and consequently is used on the farm where it has been made, i.e., put to the purpose for which it was intended originally. Pastures lend themselves admirably to the making of silage. The clipping of pastures in periods of rank growth when parts of the herbage appear unpalatable to the stock, will furnish a valuable contribution to the silo, and at the same time improve the uniformity of the pasture and the quality of the herbage produced.

Despite the general paucity of green feed in the district it was remarkable to find that very little reduction in the number of stock on these properties had been effected.

It was still more remarkable to find both cattle and sheep in very good condition, and that up to the time of judging the farmers concerned had resorted to hand feeding only to a small extent. This testified to the quality of the dry feed on the sown down pastures. On pastures at the Werribee Research Farm, which had not been irrigated since the 1st November, this type of dry feed was maintaining three ewes per acre during the month of February.

The conditions generally emphasized the necessity for conserving fodder in excess of the requirements for one year even on an irrigation property, since after two consecutive dry seasons there is always the possibility of a restriction of water supply, with very serious consequences on properties which are generally stocked up to the limit of their capacity. In the competition conducted two years ago, perhaps too much importance was attached to excess of fodder over requirements in that 50 points were allotted to excess fodder as compared with 35 for actual requirements. Since then the schedule has been revised and this position reversed, reasonably adjusting the relative importance of the two factors. However, fodder conserved in excess of requirements rightly has remained a sufficiently important factor to give a decided advantage to any competitor who took due cognizance of this aspect of fodder conservation.

### *The Awards.*

The farm of Mr. S. Musselwhite, of Koyuga, was a picture of intense production from a relatively small area, and this wealth of production enabled Mr. Musselwhite to gain first place in the competition this year. Of the total area of 38 acres, 25 acres are irrigable, the remainder being situated on too high a level. The water right is 24 acre-feet but in a normal season nearly three times this amount is used on the lucerne and pastures. The water right was exhausted in November this season, but fortunately Mr. Musselwhite was able to transfer to his home farm 20 acre-feet of water

from a leased property. This additional water had enabled him to keep his lucerne and pastures in actively growing condition up to the time of the competition. Magnificent pasture swards of rye-grass, cocksfoot, paspalum and white and strawberry clovers were noted, and there still remained to be cut 6 acres of a very heavy crop of lucerne.

Some 37 head of live-stock were maintained on this farm, comprising 26 milking cows, one yearling heifer, a bull, seven poddies, one draught horse, and a pony. The farm was well subdivided and by a system of rotational grazing it was possible to take full advantage of the feed offering without damage to the sward, and at the same time reserve paddocks for cutting as opportunity offered. The milking cows were heavy producers and their condition reflected the care and attention paid to their feeding. By the rules of the competition, Mr. Musselwhite was the only competitor who had conserved on his property fodder in excess of one year's requirements, but in addition to this fodder he had bought 4 tons of bran and several tons of cereal hay. Of course, for purposes of the competition no account was taken of the fodder not conserved on the property.

The fodder reserves consisted of 19 tons of prime lucerne hay in two stacks, a stack containing 15 tons of first cut pasture hay and a fourth stack of 11 tons of excellent quality meadow hay rich in clover content.

The stacks occupied a fairly central position on the farm in one corner of a stubble paddock which was non-irrigable, being well above flooding level. The fence round the stacks had not been completed and consequently they were not entirely protected from stock. Fire risk was not very great, since the ground in proximity to the stacks was practically bare. As is usual with this type of hay the stacks were not thatched, but had been well

*Fodder reserves on the property of Mr. S. E. Paynter.*

ECHUCA FODDER CONSERVATION COMPETITION, 1939.

*Details of Award.*

| Competitor. | (1) Suitability and Quality. (65). | | (2) Location and Protection. (30). | | (3) Economy. | (4) Carrying Capacity. (50). | | (5) | Total. |
|---|---|---|---|---|---|---|---|---|---|
| | Suitability of Fodder for Purpose. | Appearance, Palatability and Nutritive Value. | Location of Site *re* Fire, Flood, Economy of Feeding and General Access. | Protection from Weather, Stock, Fire, and General Deterioration. | Production, Storage and Feeding Costs. | Growing Green Forage Crop or Condition of Lucerne or Pasture. | Amount per Head Based on present Carrying Capacity. | Quantity of Fodder in Excess of Actual requirements. | |
| | 30 | 35 | 10 | 20 | 20 | 10 | 40 | 35 | 200 |
| 1. S. Musselwhite | 28 | 33 | 6 | 13 | 17 | 10 | 40 | 10 | 157 |
| 2. T. Gass .. | 29 | 34 | 8 | 15 | 18 | 10 | 39 | .. | 153 |
| 3. A. W. Rowley | 27 | 32 | 7 | 16 | 17 | 9 | 40 | .. | 148 |
| 4. H. P. Watson | 27 | 30 | 10 | 19 | 19 | 7 | 33 | .. | 145 |
| 5. J. B. Stanworth .. | 25 | 31 | 7 | 15 | 15 | 9 | 34 | .. | 136 |
| 6. E. Watson .. | 26 | 28 | 6 | 13 | 17 | 10 | 33 | .. | 133 |
| =7. S. E. Paynter | 24 | 30 | 7 | 15 | 14 | 3 | 30 | .. | 123 |
| =7. Wilson G. J. Beer .. | 26 | 28 | 7 | 17 | 17 | 3 | 25 | .. | 123 |
| 9. K. McRae .. | 23 | 28 | 6 | 13 | 13 | 3 | 21 | .. | 107 |

built and should turn the rain off very well. Of course, there would be considerable deterioration of the hay all over the outside of the stacks. There was no special protection from vermin, but this type of hay is not liable to suffer much damage in this respect.

Mr. T. Gass, of Koyuga, again won second place in the competition. A survey of this very attractive property reveals the good farming methods which are employed. The pastures were looking dry owing to the shortage of water, but owing to the good treatment which has been meted out to them for many years there was no doubt that they would soon recover when better weather conditions supervened. Despite the dryness lucerne was making remarkable growth and 9 acres of heavy lucerne was ready for cutting. Since settling on this property, Mr. Gass has appreciated the value of top-dressing, and has used superphosphate for over twenty years, and for a good number of years has used it at the rate of two bags per acre each year. On this property of 130 acres, 100 acres are laid down in pastures and lucerne, and all the fodder reserves are harvested from these permanent crops. There is a water right of 133 acre-feet and 40 acre-feet had been transferred from another area. Of the total water right of 170 acre-feet, 85 per cent. had been supplied. In a normal year Mr. Gass uses about 320 acre-feet, so less than half the normal supply had been used this season.

The stock comprise 46 cows, 17 heifers (eighteen months to two years old), 15 calves, 2 bulls, 3 draught horses, and 2 ponies. Part of the property is separated from the main body of the farm by a roadway, and on this section a separate stack yard has been constructed. This had a stack of 13 tons of prime lucerne hay. In the homestead stack yard, which was well fenced and protected from fire by clean ground, there were three very well-built stacks comprising 35 tons of lucerne hay and 19 tons of pasture hay which was nearly all clover. The provision of two stack yards facilitated feeding out on the two sections of the property. The stacks were not thatched.

Mr. A. W. Rowley, of Koyuga, who scored so well in the competition two years ago, gained third place with a well-filled stack yard. On this farm of 173 acres, 155 acres are irrigable, and the water right is 160 acre-feet, of which 150 acre-feet had been supplied this year. Normally approximately 250 acre-feet of water would be used. Mr. Rowley has the greater proportion of his irrigable area under lucerne (95 acres) and, despite the shortage of water, this has made excellent growth—mainly because of the liberal use of superphosphate. This growth of lucerne has facilitated the harvesting and conservation of good quality hay this season. In four stacks and a butt there were 94 tons of lucerne hay all conserved this season; 28 tons of this had a considerable proportion of rye-grass, cocksfoot and white clover. One stack of 11 tons of oaten hay had been conserved this year, while a stack of 11½ tons of oaten hay had been carried over from the previous season. The stacks of cereal hay had been thatched with green lucerne, and this apparently adhered very firmly to the roofs of the stacks as it dried out. The stack yard was very securely fenced, and the ground surface was clear all round.

The stock comprised 80 milking cows, 14 heifers over eighteen months, 14 poddies up to twelve months, 2 bulls and 5 draught horses—a very creditable carrying capacity. Despite the dry season and the large number of stock carried, a further 20 acres of lucerne was being reserved for cutting.

It will be noted that the three prize-winners are all dairy farmers, and this might be expected since, in the past, dairy farmers have had a better appreciation of the value of fodder conservation than have the sheep men. They well know what will happen to the production from their herds if the supplies of feed are not kept up to the animals—the milk supply constitutes a daily barometer warning them of deficiencies.

To discover a sheep farmer who had a full appreciation of the merits of conservation, and who on a fairly large property had made very creditable and carefully planned efforts to meet all requirements, was one of the highlights of this competition. Mr. H. P. Watson, of Echuca Park, had made remarkable advances in face of great difficulties this season to attain ideal conditions. On this property of 869 acres, 579 acres are laid out for irrigation, of which approximately 100 acres are in lucerne, 50 acres in perennial type pasture, and the rest in annual type pasture of Wimmera rye-grass and subterranean clover. 1,000 ewes and 1,050 lambs were on the property at the time of inspection, comprising several stud flocks, and in addition there were 22 Shorthorn cows, 15 draught horses and 3 light horses.

Over 180 tons of various classes of fodder had been conserved this year and, of this, nearly 100 tons was baled and stored in six well-built sheds which were scattered judiciously about the property. In three good stack yards there was about 70 tons of hay half of which was cereal hay and the remainder pasture hay. More than half the baled hay was lucerne, while the remainder

was a mixture of lucerne with oaten hay or wheaten hay or grass. There were 11 tons of cereal chaff in a well-made chaff shed. A good proportion of the feed is chaffed and fed out in self-feeders to the sheep. The baling of the hay facilitates handling in feeding out, and minimizes the amount of storage space required. Also, the hay being under cover is less liable to deteriorate than in a stack in the open. Both the sheds and stack-yards were well fenced off from the stock with wire netting and barbed wire, and the ground was free from undergrowth in the immediate vicinity; 26 acres of beautiful lucerne still remained to be cut, and there was an excellent crop of saccaline growing in a 14-acre paddock.

*A useful type of self-feeder for sheep used by Mr. K. McRae.*

The water right is 500 acre-feet, but only about 50 per cent. of this had been supplied this season. This made this particular performance in fodder conservation this year all the more remarkable.

In conclusion, one must commend the holding of competitions of this nature, and it is considered that the Royal Agricultural Society made a splendid effort to focus attention on this very important aspect of farm economy when they subsidized district societies to enable them to conduct such competitions. It is most probable that but for the competition conducted in the Echuca district two years ago nothing like the quantity or quality of the fodder reserves would have been found in this most abnormal season.

# Tubercle Free Herds

The following herds have been declared free of tuberculosis under the scheme conducted by the Department of Agriculture. Under this scheme a tuberculosis-free accredited herd of cattle is one in which the entire herd has passed two negative, successive, annual physical examinations and tuberculin tests, or, upon disclosure of infection, three semi-annual, successive physical examinations and tuberculin tests applied by a State Veterinarian or by a qualified and registered veterinarian who is approved by the Chief Veterinary Inspector for that purpose.

ACCREDITED TUBERCLE FREE HERDS.

| Herd Number. | Name. | Address. | Number in Herd. | Herd Number. | Name. | Address. | Number in Herd. |
|---|---|---|---|---|---|---|---|
| 1 | State Research Farm | Werribee .. | 190 | 10 | Banyule Stud Pty. Ltd. | Heidelberg .. | 122 |
| 2 | Warragul High School | Warragul .. | 35 | 11 | McIntosh, John .. | "Burnwood," Merrigum | 31 |
| 3 | Payne, A. E. T. .. | "Yarra View," Lilydale | 80 | 12 | Black, Mrs. Agnes .. | Mount Noorat | 40 |
| 4 | Dennis, Mrs. A. A. .. | Frankston .. | 14 | 13 | Black, Estate, Late I. S. | "The Cottage," Mount Noorat | 44 |
| 5 | Lady Talbot Milk Supply Company | Cranbourne .. | 418 | 14 | Read, John D. .. | "Springhurst Estate," Springhurst | 99 |
| 6 | Reid, Ralph G. .. | "Holmwood," Koo-wee-rup | 99 | 15 | Kelly, C. .. | "Glenmore," Creighton's Creek, Euroa | 22 |
| 7 | Harris, J. W. .. | "Rowena," Clyde | 72 | 16 | Gorman, A. W. .. | "Cathcart," Alexandra | 57 |
| 8 | School of Horticulture | Burnley .. | 8 | 17 | Samuel, B. T. .. | Lang Lang .. | 72 |
| 9 | Lawrence, P. H. .. | "Rainga," Tarrawarra | 59 | | | | |

*The Burnley Competition Pens.* [Kraft Walker Cheese Co. Pty. Ltd. block.

# *Burnley Egg-Laying Competition*

## *New Record Established*

*H. F. Clinton, Poultry Expert*

THE twenty-eighth Egg-laying Competition for fowls, conducted at the Burnley School of Primary Agriculture and Horticulture, commenced on 1st April, 1938, and concluded on 2nd March, 1939, a period of 48 weeks. Egg-laying competitions are exceedingly popular throughout the world. It is to be hoped that the Burnley competition will continue to be well supported by the poultry breeders of Victoria, for it must be remembered that these competitions are conducted for breeders on their behalf by an independent and official organization, the State Government of Victoria, which, therefore renders a very distinct service to the industry.

The Burnley Competitions commenced in 1911, and the highest number of eggs laid by a team of six birds for 12 months, since the commencement and up to the 1937–38 competition, was that recorded in the 1927–28 competition by a team of six Black Orpingtons (now Australorps) owned by the Wingood Poultry Yard. This team (wet mash section) laid 1,723 eggs (110 of which were under first grade). In the 1938–39 competition just concluded, a new Burnley record for 12 months was established by Mr. J. Herbert's team of six Australorps, his birds having laid 1,740 eggs (only six of which were under first grade) in the 12 months ending 31st March, 1939.

Rule 1 of the competition is as follows:—The Competition will be decided on the greatest number of first-grade eggs laid in the 48 weeks from 1st April, 1938, to 2nd March, 1939; but if on 2nd March, 1939, any team of birds in Section A has laid not less than 1,549 eggs, and any individual bird in Section B not less than 309 eggs, these birds may be retained till 31st March, 1939, and in the event of them equalling or exceeding the present official Burnley Record, a special certificate will be awarded. As Mr. Herbert's team laid more than the required number of eggs in the 48 weeks of the competition, they were, according to the above rule, entitled to be retained for 12 months.

The highest number of eggs laid by a single bird for 12 months since the commencement of the Burnley Competitions to date was that recorded in 1923–24 by a Black Orpington (now Australorp) owned by W. Cullen. This "wet mash" bird laid 338 eggs (last egg weighed 2 7/16 oz.). White Leghorns follow closely for the highest records at Burnley, which are as follow:—For a team of six birds: W. N. O'Mullane, 1914–15, 1,699 eggs (qualified for weight of egg during the month of July), (dry mash). For a single bird: J. L. Edgcumbe, 1931–32, 337 eggs, all first grade, (wet mash).

Over 300 visitors attended the poultry farmers' field day at the Burnley Gardens on Saturday afternoon, 4th March, 1939, when the opportunity was taken to inspect the prize winners and other competition birds at the conclusion of the 1938–39 Competition. Short talks were given by Departmental officers, and an exhibit of poultry appliances, records, foods, and eggs, was displayed in the pavilion. The field day is held at the conclusion of the competition each year. The day proved to be an outstanding success, largely due, no doubt, to the great

assistance rendered by the National Utility Poultry Breeders' Association, Victorian Branch, representatives of poultry organizations and visitors from country districts, and to the great number of competitors and supporters of the Burnley Competition.

In the competition just concluded, prize certificates and sashes were awarded for the greatest number of first-grade eggs laid. During the first two months of the competition a first-grade egg must weigh not less than $1\frac{3}{4}$ oz., and thereafter not less than 2 oz. At Burnley every egg is weighed and recorded to one-tenth of an ounce. Each bird is also weighed at the commencement and conclusion of the competition, in order to ascertain the relationship between the weight of the birds and egg production. These records are available for examination by any competitor who can thus compare the performances of various birds, and, if he wishes, ascertain the weight of each of his birds and of every egg laid throughout the period of the competition.

*This Australorp, owned by Mr. J. Grass, laid 294 first-grade eggs—the highest individual score in the competition.*

It is pleasing to note the increasing popularity of Rhode Islands. In this year's competition there were 74 Rhode Island Reds entered, which is the highest number for this breed that has competed in any Burnley Competition. Special Classes were provided for Rhode Island Reds in Section A, and Rhode Islands in Section B.

## TABLE SHOWING MONTHLY LAYING RETURNS.

| Month. | Light Breeds. | | | | | | Heavy Breeds. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | White Leghorns. | | | Other Light Breeds. | | | Australorps. | | | Other Heavy Breeds. | | |
| | Average No. of Birds. | Total. | Average. | Average No. of Birds. | Total. | Average. | Average No. of Birds. | Total. | Average. | Average No. of Birds. | Total. | Average. |
| | | | | | *Section A.* | | | | | | | |
| April .. .. | 204 | 3,029 | 14·3 | 12 | 108 | 9·0 | 126 | 2,152 | 17·1 | 48 | 352 | 7·3 |
| May .. .. | 203·6 | 3,051 | 14·9 | 11·4 | 85 | 7·4 | 125·6 | 2,388 | 19 | 48 | 546 | 11·4 |
| June .. .. | 203 | 2,636 | 13·0 | 11 | 55 | 5·0 | 125 | 2,319 | 18·5 | 48 | 560 | 11·7 |
| July .. .. | 203 | 3,074 | 15·1 | 11 | 87 | 7·9 | 124·3 | 2,355 | 18·9 | 47·4 | 551 | 11·6 |
| August .. .. | 202·2 | 3,866 | 19·1 | 10·5 | 147 | 14·0 | 122·6 | 2,602 | 21·2 | 47 | 733 | 15·6 |
| September .. | 201 | 4,442 | 22·1 | 10 | 173 | 17·3 | 121 | 2,638 | 21·8 | 46 | 972 | 21·1 |
| October .. .. | 199·7 | 4,544 | 22·7 | 10 | 222 | 22·2 | 120·2 | 2,484 | 20·7 | 45 | 915 | 20·3 |
| November .. | 199 | 4,138 | 20·8 | 10 | 178 | 17·8 | 119·9 | 2,086 | 17·4 | 44·6 | 784 | 17·6 |
| December .. | 196·5 | 3,781 | 19·2 | 10 | 133 | 13·3 | 118·9 | 1,997 | 16·8 | 44 | 676 | 15·4 |
| January .. .. | 191·3 | 3,436 | 18·0 | 9·3 | 94 | 10·1 | 114·6 | 1,815 | 15·8 | 44 | 663 | 15·1 |
| February .. | 187 | 3,013 | 16·1 | 9 | 102 | 11·3 | 113 | 1,673 | 14·8 | 43·2 | 641 | 14·8 |
| | | | | | *Section B.* | | | | | | | |
| April .. .. | 120 | 1,954 | 16·3 | 8 | 54 | 6·7 | 64 | 883 | 13·8 | 38 | 395 | 10·4 |
| May .. .. | 120 | 2,219 | 18·5 | 8 | 94 | 11·7 | 63·8 | 1,065 | 16·7 | 38 | 454 | 11·9 |
| June .. .. | 120 | 2,041 | 17 | 8 | 81 | 10·1 | 63 | 1,241 | 19·7 | 38 | 521 | 13·7 |
| July .. .. | 120 | 1,975 | 16·5 | 8 | 81 | 10·1 | 63 | 1,331 | 21·1 | 38 | 601 | 15·8 |
| August .. .. | 120 | 2,331 | 19·4 | 8 | 143 | 17·9 | 63 | 1,337 | 21·2 | 38 | 598 | 15·7 |
| September .. | 118·9 | 2,677 | 22·5 | 8 | 156 | 19·5 | 62·7 | 1,411 | 22·5 | 38 | 722 | 19 |
| October .. .. | 118 | 2,748 | 23·3 | 8 | 165 | 20·6 | 62 | 1,367 | 22·0 | 38 | 697 | 18·3 |
| November .. | 118 | 2,581 | 21·9 | 8 | 143 | 17·9 | 61·1 | 1,069 | 17·5 | 37·6 | 585 | 15·6 |
| December .. | 118 | 2,491 | 21·1 | 8 | 129 | 16·1 | 59·8 | 995 | 16·8 | 37 | 497 | 13·4 |
| January .. .. | 115·4 | 2,311 | 20 | 8 | 114 | 14·2 | 58 | 900 | 15·5 | 37 | 498 | 13·4 |
| February .. | 113·3 | 2,095 | 18·5 | 8 | 97 | 12·1 | 58 | 876 | 15·1 | 36·8 | 428 | 11·6 |

*Mr. J. Herbert's record breaking Australorp team which laid 1,740 eggs for the 12 months' period. The previous record (1,723 eggs) was established by the Wingood Poultry Yard in 1927-28.*

The mortality amongst the competing birds in this competition was higher than usual, viz., 8.9 per cent. The excessive hot weather that occurred during the summer months was probably the worst ever experienced by poultry keepers in Victoria, and this was the principal reason for the comparatively high death rate, as no less than seventeen birds died from heat apoplexy. During the previous competition only three deaths occurred from this cause.

The average number of eggs produced by the fowls compared with that of the last three years continues to be highly satisfactory, as can be seen from the following table:—

AVERAGE NUMBER OF EGGS LAID PER BIRD.

| Competition. (48 weeks.) | First Grade. | Under-weight. | Total. |
|---|---|---|---|
| 1935-36 .. .. | 176·8 | 7·8 | 184·6 |
| 1936-37 .. .. | 183·7 | 4·4 | 188·1 |
| 1937-38 .. .. | 190·3 | 2·9 | 193·2 |
| 1938-39 .. .. | 190·2 | 4·9 | 195·1 |

The table on the next page which sets out the percentages of first-grade eggs, underweight eggs, mortality, &c., during the past fourteen years is also of interest.

A special section was provided this year, for the first time, for members of Young Farmers' Clubs. In addition it was decided also, commencing with this competition, to award prize certificates for the birds laying the greatest weight of eggs.

## *The Awards.*

The principal feature of the competition just concluded was the high scores recorded by some of the prize winning birds, compared with last year. An outstanding performance was that of Mr. J. Herbert's team of Australorps, Class 4, which laid 1,642 first-grade eggs, 294 first-grade eggs more than that laid by the winning team in this Class the previous year. This team as previously mentioned, was retained for 12 months and laid 1,734 first-grade eggs, and 6 eggs underweight, a total of 1,740 eggs.

Mr. F. W. Becker's team of White Leghorns, Class 1, Wet Mash, laid 1,558 first-grade eggs, 151 first-grade eggs more than that laid by the winning team in this Class last year. An Australorp in Section B, Class 4, owned by Mr. J. Grass, laid 294 first-grade eggs, 22 more than last year's winner in the same Class.

Another pleasing feature was the increase in the number of prize certificates and certificates of merit awarded. There were eighteen more this year than for the previous competition.

### Teams of Six.

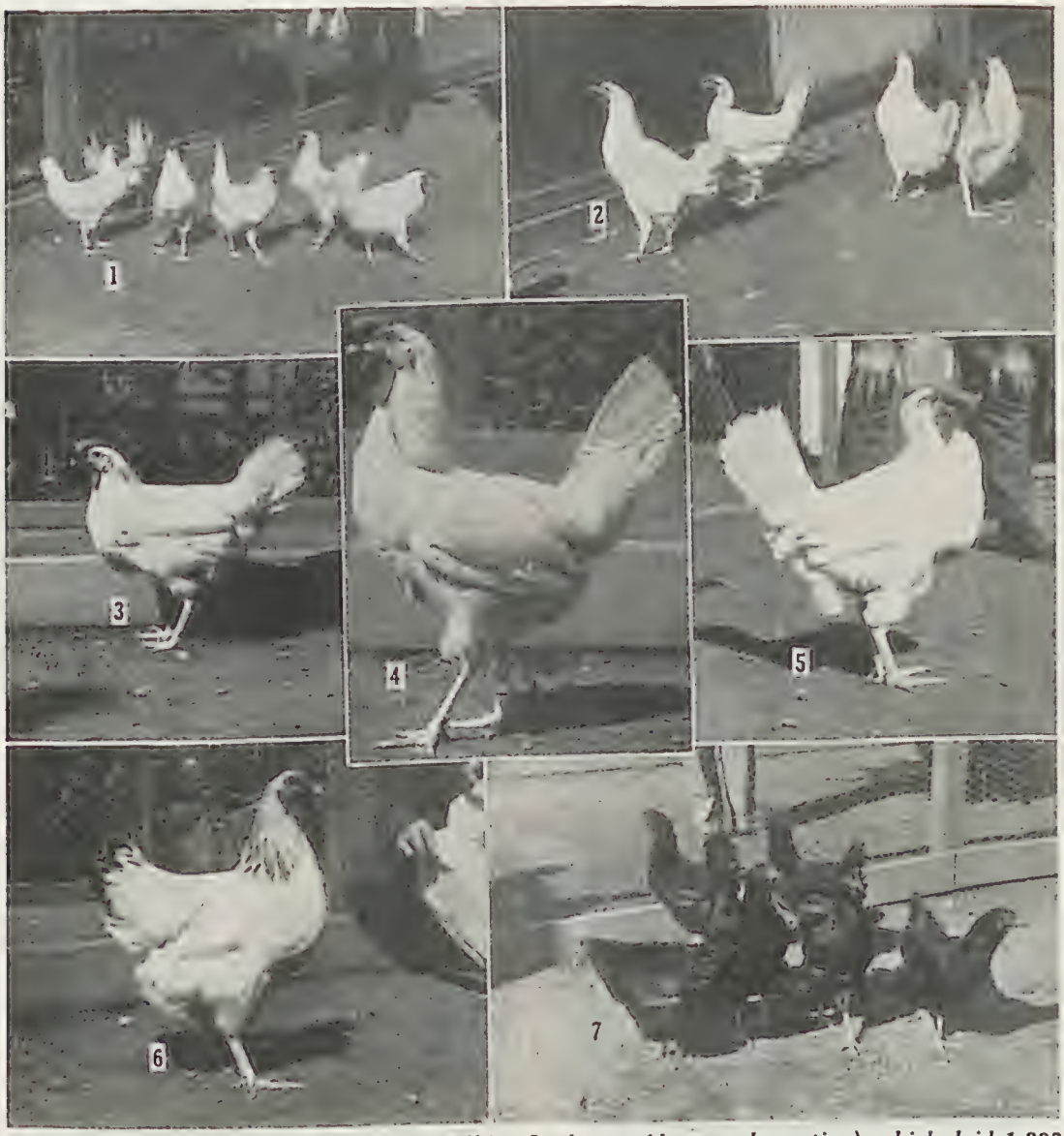
In Section A, Class 1, White Leghorns, Wet Mash, Mr. F. W. Becker won first prize with a team that laid 1,558 first-grade eggs—the second highest score recorded in Section A. This was possibly the fastest team that has competed at Burnley for some years. Mr. Becker was most unfortunate in losing two birds towards the end of the test when there was an excellent chance of exceeding the existing twelve month's record. The eggs laid were of large size and good in texture of shell. The birds showed an average increase in weight of approximately 14 oz. per bird.

Messrs. C. & D. McLauchlan were awarded second prize; their team laid a total of 1,367

Showing the Improvement in Percentage of First-Grade Eggs, 1925–26 to 1938–39.

| Year. | Percentage of First-Grade Eggs. | Percentage of Underweight Eggs. | Average Number of Eggs per Bird. | Percentage Mortality. |
|---|---|---|---|---|
| 1925–26 (365 days) .. .. .. | 79·8 | 20·2 | 206·3 | 5·4 |
| 1926–27 (48 weeks) .. .. .. | 86·0 | 14·0 | 202·3 | 3·9 |
| 1927–28 ,, .. .. .. | 88·4 | 11·6 | 197·8 | 4·2 |
| 1928–29 ,, .. .. .. | 90·8 | 9·2 | 199·0 | 6·7 |
| 1929–30 ,, .. .. .. | 89·9 | 10·1 | 187·3 | 4·3 |
| 1930–31 ,, .. .. .. | 90·3 | 9·7 | 193·3 | 6·4 |
| 1931–32 ,, .. .. .. | 92·6 | 7·4 | 195·2 | 5·1 |
| 1932–33 ,, .. .. .. | 93·6 | 6·4 | 189·9 | 5·5 |
| 1933–34 ,, .. .. .. | 93·5 | 6·5 | 185·1 | 7·7 |
| 1934–35 ,, .. .. .. | 94·7 | 5·3 | 186·4 | 6·4 |
| 1935–36 ,, .. .. .. | 95·8 | 4·2 | 184·6 | 8·9 |
| 1936–37 ,, .. .. .. | 97·6 | 2·4 | 188·1 | 6·1 |
| 1937–38 ,, .. .. .. | 98·5 | 1·5 | 193·2 | 6·6 |
| 1938–39 ,, .. .. .. | 97·5 | 2·5 | 195·1 | 8·9 |

*Some of the 300 visitors who attended the Poultry Farmers' Field Day at Burnley early last month.*




*1. Mr. C. R. Fagg's winning team of White Leghorns (dry mash section) which laid 1,223 first-grade eggs. 2. The winning White Leghorn team (wet mash) owned by Mr. F. W. Becker—1,558 first-grade eggs. 3. A White Leghorn, from Mr. Becker's winning team, which laid 293 first-grade eggs to win the section for the greatest weight of eggs. 4. Mr. M. G. Skinner's White Leghorn, winner of dry mash section (278 eggs). 5. Winner of the wet mash section for White Leghorns, with 280 eggs (Mr. E. Abikhair). 6. Mr. H. R. Cropley's Light Sussex (251 eggs). 7. Pine View Poultry Farm's winning team of Rhode Island Reds (1,049 eggs).*

eggs. Mr. J. F. Cowan was awarded third prize with a team that laid 1319 eggs. A bird in Mr. Becker's winning team laid 293 first-grade eggs, the highest score laid by an individual bird in all Classes of Section A, and only 1 egg less than the highest individual score in all Classes of Section B.

In Class 2, White Leghorns, Dry Mash, first prize went to Mr. C. R. Fagg, with a team that laid 1,223 first-grade eggs. This was a strong vigorous team, and won by one egg on the last day of the competition. The eggs were of good size and texture of shell. There was an increase in the weight of the birds of $8\frac{1}{3}$ oz. per bird.

Mr. J. M. Sutherland followed closely for second prize with 1,222 eggs, only 1 egg behind the winner. A bird in this Class, belonging to Messrs. Aitken & Grenville, laid 242 first-grade eggs.

In Class 4, Australorps, Mr. J. Herbert won first prize with a team that laid a total of 1,642 first-grade eggs—the highest score recorded in all Classes of Section A. As mentioned previously, these birds were retained for 12 months and exceeded the previous record in number of eggs laid. This was a very strong team, of excellent quality, and particularly strong in head points. The eggs were of a good size and texture of shell. There was an increase in weight of the birds of 10 oz. per bird. Mr. W. A. Shevill was awarded second prize for a team that laid 1,351 eggs, and Mrs. S. A. Kelly won third prize with 1,326 eggs. A bird in Mr. J. Herbert's winning team in this Class laid 288 first-grade eggs, the second highest score recorded by an individual bird in all Classes of Section A.

In Class 5, Rhode Island Reds, Pine View Poultry Farm (R. Willmott) was awarded first prize for a team that laid 1,049 first-grade eggs. These birds were good specimens of the breed, and of a good type and colour. The eggs were of a good size and texture of shell. There was an increase in the weight of the birds of $4\frac{1}{3}$ oz. per bird. Mr. H. Dibbs won second prize with 1,046 eggs, only 3 behind the winner. A bird in Pine View Poultry Farm's winning team in this Class, laid 235 first-grade eggs.

### Individual Birds.

In Section B, Class 1, White Leghorns, Wet Mash, first prize was won by Mr. E. Abikhair with a bird that laid 280 first-grade eggs. This was a strong vigorous bird, and of a good type and quality. It increased 12 oz. in weight. Messrs. Aitken & Grenville followed closely for second prize with a total of 275 eggs, and Messrs. T. A. Welch and A. T. Dent were equal third with birds that laid 273 eggs each, only 2 behind the second prize birds.

In Class 2, White Leghorns, Dry Mash, first prize was won by Mr. M. G. Skinner with a bird that laid 278 first-grade eggs. This was a very hardy bird, of a good type, and finished the test in excellent condition. The eggs were of a good size and texture of shell. The bird increased 8 oz. in weight. Mr. H. I. Jolly won second and third prizes with birds that laid 260 and 257 eggs respectively.

**STATEMENT SHOWING THE NUMBER OF EGGS LAID BY THE VARIOUS BREEDS IN THE COMPETITION, AND THE AVERAGE NUMBER OF EGGS LAID PER BIRD.**

| Breeds. | No. of Birds. After Allowing for Deaths. | Eggs Laid. | | | Average Number of Eggs Laid per Bird. | | |
|---|---|---|---|---|---|---|---|
| | | 1st Grade. | Under-weight. | Total. | 1st Grade. | Under-weight. | Total. |
| Light Breeds—Wet Mash— | | | | | | | |
| White Leghorns | 245 | 49,763 | 1,044 | 50,807 | 203·1 | 4·3 | 207·4 |
| Brown Leghorns | 16 | 2,282 | 145 | 2,427 | 142·6 | 9·1 | 151·7 |
| Andalusians | 2 | 213 | 1 | 214 | 106·5 | 0·5 | 107·0 |
| Total Light Breeds—Wet Mash | 263 | 52,258 | 1,190 | 53,448 | 198·7 | 4·5 | 203·2 |
| Light Breeds—Dry Mash— | | | | | | | |
| White Leghorns | 72 | 13,473 | 153 | 13,626 | 187·1 | 2·1 | 189·2 |
| Total Light Breeds—Wet and Dry Mash— | 335 | 65,731 | 1,343 | 67,074 | 196·2 | 4·0 | 200·2 |
| Heavy Breeds—Wet Mash— | | | | | | | |
| Australorps | 179 | 34,721 | 1,385 | 36,106 | 194·0 | 7·7 | 201·7 |
| Australorps (Young Farmers' Club) | 4 | 876 | 2 | 878 | 219·0 | 0·5 | 219·5 |
| Rhode Island Reds | 72 | 11,158 | 126 | 11,284 | 155·0 | 1·7 | 156·7 |
| Rhode Island Whites | 2 | 312 | 3 | 315 | 156·0 | 1·5 | 157·5 |
| Light Sussex | 10 | 1,728 | 62 | 1,790 | 172·8 | 6·2 | 179·0 |
| Total Heavy Breeds | 267 | 48,795 | 1,578 | 50,373 | 182·8 | 5·9 | 188·7 |
| Total All Breeds—Wet and Dry Mash | 602 | 114,526 | 2,921 | 117,447 | 190·2 | 4·9 | 195·1 |

*Mr. R. Farrin Webb's Rhode Island Red (256 first-grade eggs).*

In Class 4, Australorps, first prize was won by Mr. J. Grass, with a bird that laid 294 first grade eggs the highest score recorded by any individual bird in both Sections A and B. This was a good bird, of excellent type and quality, and finished the test in very good condition. The eggs were of a good size and texture of shell. There was an increase in weight of this bird of 1 lb. 2 oz. Mr. W. Cullen gained second prize with a total of 284 eggs, 10 eggs behind the winning bird, and Mr. C. H. Harvey followed closely for third prize with a bird that laid 283 eggs, only 1 egg less than that recorded by the second prize bird.

In the Class for Rhode Islands, Mr. R. Farrin-Webb won first prize with a Rhode Island Red that laid 256 first-grade eggs. This was a good, strong, robust hen, of a good type and very nice colour, and finished the test in very good condition. The eggs were of a good size and texture of shell. This bird increased 12 oz. in weight. Second prize was secured by Mr. J. Chatts with a bird that laid 243 eggs, while Mr. J. W. Hattwell obtained third prize with 231 eggs.

Mr. H. R. Cropley won first prize in the Class for All Heavy Breeds other than Australorps and Rhode Islands with a Light Sussex that laid 251 first-grade eggs. This bird was a good specimen of the breed, and the eggs laid were of a good size and texture of shell. The increase in weight of this bird was 1 oz. Messrs. C. & D. McLauchlan secured second prize with a Light Sussex that laid 228 eggs.

For Individual Birds, in both Sections A and B, that laid the Greatest Weight of Eggs, Mr. F. W. Becker won first prize with a White Leghorn that laid 293 eggs, weighing 655.8 oz. (40 lb. 15.8 oz.). Second prize was secured by Mr. J. Grass with an Australorp that laid 294 eggs, weighing 646.3 oz. (40 lb. 6.3 oz.); and Mr. J. Herbert was third with an Australorp that laid 286 eggs, weighing 639.4 oz. (39 lb. 15.4 oz.). Mr. Herbert's bird was retained for 12 months and laid 308 eggs, weighing 690.3 oz. (43 lb. 2.3 oz.). The number of eggs shown above was the total number laid by each of these birds, and were all first-grade.

### Young Farmers' Clubs.

In the Young Farmers' Clubs Section, Australorps, Miss Marjorie Parker won first prize with a bird that laid 238 first-grade eggs. This was a typical bird, possessing good constitutional vigor, and finished the test in very fine condition. The eggs were of a good size and texture of shell. The bird increased 8 oz. in weight. Miss Flora Rhodes won second prize with a bird that laid 225 eggs, while Miss Marjorie Parker obtained third prize with 222 eggs, only 3 eggs less than

*Miss Marjorie Parker's prize winning bird which laid 238 first-grade eggs.*

that laid by the second prize bird. All the prize winners in this Section are Members of the Mickleham Young Farmers' Club.

### Weights of Winning Birds.

The weights at the beginning and at the end of the competition of those birds laying the greatest number of eggs are as follow :—

| — | Bird No. | Weights at April, 1938. | Weights at March, 1939. | First Grade Eggs. |
|---|---|---|---|---|
| | | lb. oz. | lb. oz. | |
| **Section "A"—Teams of Six Birds.** | | | | |
| *Light Breeds.* | | | | |
| F. W. Becker's White Leghorns (Pen 2) | 7 | 5 2 | died 13·1·39 | 241 |
| | 8 | 4 0 | 4 12 | 279 |
| | 9 | 4 6 | 5 1 | 280 |
| | 10 | 4 0 | died 15·12·38 | 214 |
| | 11 | 5 2 | 6 8 | 293 |
| | 12 | 5 0 | 5 10 | 251 |
| *Heavy Breeds.* | | | | |
| J. Herbert's Australorps (Pen 57) | 337 | 5 12 | 6 4 | 244 (257) |
| | 338 | 5 8 | 5 9 | 288 (295) |
| | 339 | 5 8 | 5 12 | 281 (297) |
| | 340 | 5 12 | 6 0 | 283 (300) |
| | 341 | 5 2 | 6 0 | 286 (308) |
| | 342 | 6 6 | 8 3 | 260 (277) |
| **Section "B"—Individual Birds.** | | | | |
| *Light Breeds.* | | | | |
| E. Abikhair's White Leghorn | 1 | 4 12 | 5 8 | 280 |
| *Heavy Breeds.* | | | | |
| J. Grass' Australorp | 117 | 5 14 | 7 0 | 294 |

Mr. J. Herbert's team was retained for 12 months, and the number of first-grade eggs laid for this period is shown in brackets.

## *Cost of Feeding, &c.*

The number of fowls in the competition at its beginning was 620, but 55 of these died. The number of days these latter birds collectively were in the pens was 12,564, which is equal to approximately 37 birds having been there for for the full 48 weeks. Therefore the total number of birds in the competition for the whole period may be regarded as 602, and this is the figure that has been used in working out averages, &c.

The different kinds and quantities of the food fed to the birds during the currency of the competition were as follows :—Wheat, 21,369 lb.; hulled oats, 4,420 lb.; maize, 4,826 lb.; bran, 14,122 lb.; pollard, 18,667 lb.; meatmeal, 148 lb.; pea-meal, 136 lb.; dried whey, 131 lb.; meat, 3,272 lb.; onions, 376 lb.; grit, 2,747 lb.; charcoal, 196 lb.; salt, 196 lb.

The total number of eggs laid, including those underweight was 117,447, an average per bird of 195.095 for the 48 weeks.

The price realized for the eggs averaged a fraction over 1s. 3¾d. per dozen. The market value of the eggs averaged £1 1s. 6d. per bird, and the cost of food averaged 8s. per bird (2d per week); thus the profit over cost of food for the 48 weeks averaged 13s. 6d. per bird.

The prices received for the eggs, however, are the net prices exclusive of freight or commission charges, &c. Also it must be remembered, that the eggs were laid by pullets in their first period of production, which were kept in single pens or in teams of six, the conditions being entirely different from those on commercial farms where birds of various ages are kept in large flocks.

### FOR INDIVIDUAL BIRDS, IN BOTH SECTIONS A AND B, THAT LAID THE GREATEST WEIGHT OF EGGS.

| Pen No. | Name and Address. | Bird No. | Total of all Eggs. | Weight of Eggs. |
|---|---|---|---|---|
| **SECTION A.—TEAMS OF SIX BIRDS, TRAP-NESTED.** | | | | |
| **Class 1.—White Leghorns—Wet Mash.** | | | | |
| First Prize—Champion Certificate. | | | | |
| 2 | F. W. Becker, 103 Clarence-street, Geelong West | 11 | 293 | 655·8 oz. (40 lb. 15·8 oz.) |
| **SECTION B.—INDIVIDUAL BIRDS, SINGLE TEST** | | | | |
| **Class 4.—Australorps—Wet Mash.** | | | | |
| Second Prize—Government Certificate. | | | | |
| 117 | J. Grass, 44 Station-street, Burwood | 117 | 294 | 646·3 oz. (40 lb. 6·3 oz.) |
| **SECTION A.—TEAMS OF SIX BIRDS, TRAP-NESTED.** | | | | |
| **Class 4.—Australorps—Wet Mash.** | | | | |
| Third Prize—Government Certificate. | | | | |
| 57 | J. Herbert, 13 Dunn-street, Wonthaggi | 341 | 286 (48 *Weeks.*) | 639·4 oz. (39 lb. 15·4 oz.) |

The number of eggs shown above was the total number laid by each of these birds, and were all first-grade.

The successful results achieved in the competition pens are due to good feeding and management and to the high average production of eggs of good quality, size, shape, colour, and texture of shell from birds of high quality, and constitutional vigor. When birds of this type are returned to their owners they can be used to breed stock of the highest class. That there is a keen demand for birds of the right kind is shown by the very high prices that have been paid for the best stock entered in the Burnley Egg-Laying Competitions. Owners of commercial poultry farms, by introducing birds of this description amongst their flocks, no doubt would greatly improve their average egg yield and reduce the percentage of mortality on the farm.

Competitors entering birds are advised to select only pullets bred from strong robust parents that have not suffered an illness of any description. It is only those birds bred with a high degree of constitutional vigor that can produce progeny which stand the strain of high egg production over a long period.

***The 1938-39 Burnley Egg-Laying Prize List will be found in the Supplement which accompanies this issue.***

# *International Bibliography of Agricultural Economics*

*A new quarterly publication of the International Institute of Agriculture in Rome.*

THE International Institute of Agriculture in Rome has now begun to publish a current bibliography, at quarterly intervals, which deals with agricultural economics in all its various phases. This bibliography, which is based on the material received by the Library of the Institute, is compiled under the technical direction of the Librarian, Dr. S. von Frauendorfer.

The International Bibliography of Agricultural Economics covers the economic and social aspects of agriculture, such as agricultural economics, agricultural policy, settlement, credit, co-operation, insurance, marketing, prices, statistics, farm organization and management, valuation, labour, accounting, rural sociology, agricultural history and geography, legislation and education and all other agricultural problems, in so far as they are considered from the economic and social point of view. Only publications of purely technical character are excluded. Titles of all publications, whether books, bulletins, pamphlets or articles in periodicals, are indicated, including all bibliographical details required for proper identification. All languages receive equal treatment, and titles in the less known languages are provided with a translation.

The bibliography, which is the only one which covers systematically the world literature on agricultural economics, is carefully classified by subjects. An author-index will be supplied at the end of each volume. The annual subscription, postage included, is 6s. 6d. (plus exchange).

# *Book Review*

***The G. and N. Seed Catalogue for 1939.***

This is a well-illustrated catalogue, mainly of grasses and clovers with information for their growth and management. Many seed mixtures are suggested for varying soils and climates. The book also contains essays on Soil Erosion, Seed Certification, Grassland Improvement, &c. Copies may be obtained free of charge from the Gippsland and Northern Coy. Ltd., 492 Flinders-lane, Melbourne, C.1.

# London Markets

## Weekly Prices

The following information as to prices offering in London for the principal Victorian primary products has been taken from cablegrams received each week by the Department of Agriculture from the Victorian Agent-General in London.

| Product. | | Price for Week Ending— | | | | |
|---|---|---|---|---|---|---|
| | | 3rd March | 10th March | 17th March | 24th March | 31st March |
| | | *d.* | *d.* | *d.* | *d.* | *d.* |
| Lamb, 1st quality, Victorian | 29–36 lb. | 6¼ | 6¼ | 6¼ | 6¼ | 6⅛ |
| Lamb, 1st quality, Victorian | 37–42 lb. | 6⅛ | 6 | 6 | 6 | 5⅞ |
| Lamb, 1st quality, other States | 29–36 lb. | 6¼ | 6⅛ | 6⅛ | 6 | 6 |
| Lamb, 1st quality, other States | 37–42 lb. | 6 | 6 | 6 | 6 | 5⅛ |
| Lamb, 2nd quality, Victorian | 28 lb. and under | 6¼ | 6½ | 6⅝ | 6¾ | 6¾ |
| Lamb, 2nd quality, Victorian | 29–36 lb. | 5⅞ | 6 | 6 | 6 | 6 |
| Lamb, 2nd quality, other States | 28 lb. and under | 6¼ | 6⅜ | 6½ | 6⅝ | 6⅝ |
| Lamb, 2nd quality, other States | 29–36 lb. | 5¾ | 5⅞ | 5⅞ | 5⅞ | 5¾ |
| Lamb, 3rd quality, all States | 28 lb. and under | 5½ | 6 | 6¼ | 6⅜ | 6⅜ |
| Lamb, 3rd quality, all States | 29 lb. and over | 5¼ | 5¼ | 5¼ | 5¼ | 5⅜ |
| Mutton wethers and/or maiden ewes | Under 40 lb. | 2⅞ | 3⅛ | 3¼ | 3⅜ | 3½ |
| Mutton wethers and/or maiden ewes | 41–48 lb. | 2⅞ | 2⅞ | 3 | 3⅛ | 3¼ |
| Mutton wethers and/or maiden ewes | 49–56 lb. | 2¾ | 2¾ | 2¾ | 2¾ | 3 |
| Mutton ewes | Under 40 lb. | 2¾ | 3 | 3⅛ | 3¼ | 3⅜ |
| Mutton ewes | 41–48 lb. | 2½ | 2½ | 2⅝ | 2¾ | 3 |
| Beef, frozen ox hinds | 145–210 lb. | 4 | 4 | 4 | 4 | 3⅞ |
| Beef, frozen ox crops, weights corresponding | | 3 | 3 | 3 | 3 | 3 |
| Beef, chilled ox hinds | 145–210 lb. | 4⅞ | 4⅛ | 4⅛ | 4¼ | 4½ |
| Beef, chilled ox crops, weights corresponding | | 3½ | 3 | 3¼ | 3¼ | 3½ |
| Pork, Australian 1st quality | 60–80 lb. | 7¼ | 7⅛ | 7⅛ | 7⅛ | 7 |
| Pork, Australian 1st quality | 81–100 lb. | 6⅝ | 6⅝ | 6⅝ | 6⅝ | 6⅝ |
| Pork, New Zealand 1st quality | 60–80 lb. | 7¼ | 7⅛ | 7⅛ | 7⅛ | 7 |
| Pork, New Zealand 1st quality | 81–100 lb. | 6⅝ | 6⅝ | 6⅝ | 6⅝ | 6⅝ |
| | | *s.* | *s.* | *s.* | *s.* | *s.* |
| Bacon, Canadian | per cwt. | 92 | 92 | 92 | 92 | 86 |
| Bacon, Empire (cured in England) | per cwt. | 90 | 90 | 90 | 90 | 84 |
| Bacon, Danish | per cwt. | 100 | 100 | 100 | 103 | 103 |
| Butter, unsalted, choicest grade | per cwt. | 114–116 | 116–117 | 118 | 115–116 | 114–115 |
| Butter, unsalted, 1st grade | per cwt. | 113 | 115 | 116–117 | 114 | 112–113 |
| Butter, unsalted, 2nd grade | per cwt. | .. | .. | .. | .. | .. |
| Butter, unsalted, pastry grade | per cwt. | .. | .. | .. | .. | .. |
| Butter, salted, choicest grade | per cwt. | 113–116 | 115–116 | 117 | 114–115 | 113–114 |
| Butter, salted, 1st grade | per cwt. | 113–115 | 114–115 | 115–116 | 113–114 | 112–113 |
| Butter, salted, 2nd grade | per cwt. | 111–113 | 112–113 | 114 | 112 | 110–111 |
| Butter, salted, pastry grade | per cwt. | 108–110 | 110 | 110–111 | 108–109 | 107–108 |
| Butter, Danish | per cwt. | 141 | 136 | 133 | 133 | 133 |
| Market (butter) | | Firm and dearer following an active demand at the lower prices. | Improved demand at the end of the week. | Quiet. | Quiet. | Greater activity at the end of this week. |

# *Results of 1938 Trials*

***By A. A. Lee, B.Agr.Sc., Assistant Inspector of Agriculture.***

DURING 1938, the Department of Agriculture continued its trials with flax at the same five centres as in 1937, viz., Drouin and Leongatha in Gippsland, Warncoort and Strathkellar in the Western District, and Newlyn near Ballarat. This work was commenced in 1937 in conjunction with Flax Fibres Pty. Ltd., owners of mills at Colac and Drouin, and in co-operation with selected flax growers. The trials were designed to ascertain for each district the most suitable variety, the most profitable manurial dressing and the best time, method and rate of seeding.

The trials at Warncoort, some seven miles from Colac, were rather more extensive in 1938, embracing in addition to the standard tests, seed production plots, trials with various strains of Liral Crown, and very small plots of both linseed and fibre varieties obtained from America. The standard tests at each centre were sown under a randomized block system, the individual treatments being sown in duplicate.

Sowing was commenced at Newlyn on 31st May, but was interrupted by rain when all but the variety trial had been sown, and this trial was finally drilled under rather wet soil conditions on 13th June. In the meantime, the Strathkellar plots were sown on 10th June under good conditions, some 239 points having fallen since the beginning of the month. A further 190 points fell by the end of the month, making a total of 429 points for June at Strathkellar.

The Leongatha plots were drilled under ideal conditions on 22nd June; those at Warncoort were commenced on 23rd June under good conditions and completed the following day in light showery weather, while the Drouin trials were all sown on 28th June under rather wet conditions following 487 points for the month.

June had been very wet in all flax growing districts, but this proved to be the last of the wet weather for the year; indeed at Colac Post Office, the highest fall recorded on any one day between 1st July and the end of November was 35 points.

All plots were inspected during August, when it was seen that germination was excellent. Actual counts of the normal sowing of Liral Crown at 70 lb. per acre varied from 120 plants per yard of drill row at Newlyn to 158 plants per yard at Leongatha, and this was slightly higher than the 1937 germination, which had varied from 106 to 141 plants per yard.

At this inspection, good growth was observed at all centres except Newlyn, where even in the May sown plots, growth was extremely backward. By the middle of October, however, the ground had dried out to such an extent that the infrequent showers were sufficient merely to wet the surface, and many times were followed by high winds which immediately dried the soil.

At this stage, all plots were suffering from the prolonged dry weather, those least affected being at Strathkellar; and it was realized at this period that without further rain, Strathkellar and perhaps Leongatha would be the only plots to make the standard length of 27 inches to 30 inches. The dry weather continued through November, and it is remarkable that the flax grew as well as it did under what amounted to drought conditions.

Table I. shows the actual rain received compared with the average over a period of years.

As a point of interest, the similarity between the averages of Drouin and Leongatha, and again between Warncoort, Strathkellar and Newlyn districts is quite remarkable. It will be noted that April and May in 1938 were dry, that June was wet, and that the rainfall from then to the end of the year assumed drought proportions, as will be seen by the comparisons in the July–November column, Newlyn being the worst in this regard.

### *Harvest Notes.*

Harvesting was commenced at Strathkellar on 14th November—just over a fortnight earlier than in 1937. The flax had grown exceptionally well there, and had matured out quite normally with a good length of sappy straw and an excellent head of seed. The plots were hand pulled, and when harvested, the normal Liral Crown appeared light brown in colour looking across the crop, but still with a faint green tinge. The bolls were brown, tinged with green at the apex, the seed being solid though still green. The stems were yellow for half the distance up from the ground, and then yellow-green for the top half. The leaves had fallen from the lower third of the stem; they were yellow on the middle third and yellow-green on the top third. This stage of maturity was slightly on the early side, but would correspond to the stage when growers with large areas should commence cutting so that the bulk of the crop would be cut at the best stage, and so that the last portion to be cut would not be overripe.

At the other four centres the plots were binder cut, and harvesting commenced at Warncoort on 18th November, compared with 8th December in 1937; at Drouin on 25th November, the same date as in 1937, and at Newlyn on 6th December, compared with 16th December in 1937. At these four centres, the flax did not mature out normally—rather it dried out from the green stage, and the straw became almost brittle before the seed had matured sufficiently for the crop to be taken. Crops in the Colac district which had reached sufficient height and bulk to yield upwards of 2 tons per acre in a normal year dried out and yielded only a maximum of 20 to 25 cwt. per acre.

TABLE I.—SHOWING 1938 RAINFALL AND MONTHLY AVERAGES.

| Situation of Plots. | January. | February. | March. | April. | May. | June. | July. | August. | September. | October. | November. | December. | Year. | Period July 1st–Nov. 30th. | Source of Information. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Drouin— | | | | | | | | | | | | | | | |
| 37-year Average .. | 238 | 202 | 301 | 312 | 350 | 338 | 337 | 351 | 376 | 441 | 331 | 342 | 3,919 | 1,836 | Drouin Post Office |
| 1938 .. .. | 275 | 518 | 225 | 135 | 211 | 487 | 219 | 156 | 173 | 184 | 154 | 170 | 2,907 | 886 | At plots |
| Leongatha— | | | | | | | | | | | | | | | |
| 44-year Average .. | 241 | 185 | 295 | 347 | 365 | 387 | 345 | 399 | 404 | 388 | 305 | 291 | 3,952 | 1,841 | Post Office |
| 1938 .. .. | 232 | 292 | 312 | 211 | 179 | 465 | 192 | 246 | 184 | 86 | 83 | 285 | 2,767 | 791 | Post Office |
| Warncoort— | | | | | | | | | | | | | | | |
| 39-year Average .. | 123 | 133 | 188 | 204 | 273 | 312 | 287 | 318 | 283 | 266 | 205 | 172 | 2,764 | 1,359 | Colac Post Office |
| 1938 .. .. | 259 | 215 | 165 | 188 | 86 | 440 | 199 | 199 | 172 | 71 | 93 | 134 | 2,221 | 734 | Colac Post Office |
| Strathkellar— | | | | | | | | | | | | | | | |
| 65-year Average .. | 122 | 111 | 167 | 208 | 272 | 310 | 282 | 298 | 296 | 263 | 196 | 178 | 2,703 | 1,335 | Hamilton Post Office |
| 1938 .. .. | 147 | 269 | 107 | 315 | 112 | 429 | 163 | 180 | 150 | 157 | 146 | 90 | 2,265 | 796 | At Plots |
| Newlyn— | | | | | | | | | | | | | | | |
| 40-year Average .. | 118 | 181 | 193 | 211 | 298 | 350 | 308 | 326 | 296 | 263 | 198 | 214 | 2,956 | 1,391 | Kingston |
| 1938 .. .. | 91 | 153 | 36 | 252 | 94 | 398 | 221 | 138 | 90 | 7 | 73 | 39 | 1,592 | 529 | Kingston |

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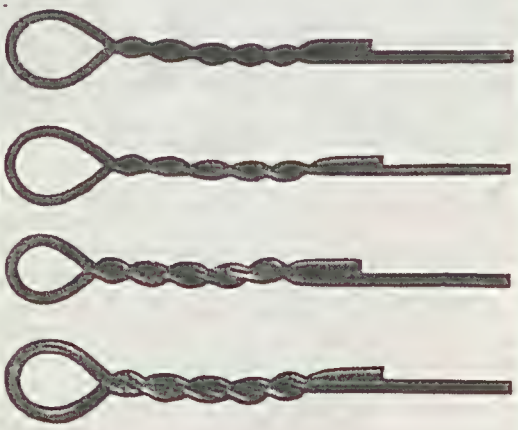

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This effect could be attributed entirely to the weather conditions, viz., the abnormally dry spring and the high temperatures experienced in the early days of November. However, if the old Blue Riga variety had been grown instead of Liral Crown, it is probable that nothing more than poor seed crops would have been harvested. While yields of only 12 to 25 cwt. per acre were obtained at four of the centres, the return of 2 to 2½ tons per acre in the plots at Strathkellar is a tribute to the productive capacity of that district.

### *The Variety Trials.*

Following the poor germination of the new Liral and Stormont strains in 1937, it was particularly gratifying to find a normal germination with all varieties. When inspected during August, the varieties at Warncoort and Newlyn showed no differences, but at Leongatha, Drouin and Strathkellar, Stormont Cirrus appeared to be slightly more forward. At Newlyn, after 70 days, the early sown Liral Crown had thrown up the stem about ¾ of an inch with two to three pairs of leaves, while that sown in June was still in the cotyledon stage after 57 days. At Strathkellar the Liral Crown was up 2 inches after 61 days, at Warncoort 1 inch to 1½ inches after 48 days, at Drouin 1½ inches to 2 inches after 58 days, and at Leongatha 3½ inches after 68 days.

By mid-October, Liral Crown was showing in bud at all centres, but was slightly more advanced at Strathkellar, where the first flowers had made their appearance 130 days from sowing time. The height of the Liral Crown here varied from 30 inches in the front of the plots to 36 inches further back in the paddock, compared with 28 inches at Leongatha after 110 days, 26 inches at Warncoort after 112 days, 22 inches at Drouin after 107 days, and 17 inches at Newlyn in the June sown plots after 129 days, and 20 inches in the May sown plots after 142 days. Typical differences between the varieties at this stage may be cited from Leongatha where these differences were recorded on 10th October, 110 days after sowing :—

| | Inches. |
|---|---|
| Blue Riga .. .. | 12 |
| Giza Purple .. .. | 14 |
| Liral Dominion | 22 |
| Latvian .. .. .. | 24 |
| Liral Monarch .. .. | 25 |
| Stormont Cirrus .. .. | 26 |
| Stormont Gossamer .. | 27 |
| Liral Crown .. .. | 28 |

By returning the highest yield of straw per acre at four of the five centres, **Stormont Cirrus** became the outstanding variety for the year. This strain is a recent development of the Ministry of Agriculture in Northern Ireland, and is officially described there as a tall variety which is slightly later in maturity than Liral Crown, and one which is suitable for sowing on heavy soils, or on soils in rather poor to medium condition.

*A crop of Liral Crown in flower on the property of Mr. C. L. James, Glengarry.*

In Victoria over the past two years, Stormont Cirrus has proved to be a tall growing strain which is slightly later in maturity than Liral Crown, but it is suggested that in normal seasons it would grow too tall in the main flax-growing areas, and so be liable to lodge. A second drawback is that this variety produces a relatively small percentage of seed. This aspect assumes more importance here perhaps than overseas, as the seed forms a valuable portion of the normal fibre crop in Victoria. This variety may find a place in this State in borderline flax-growing districts where the soil and rainfall are such that there would be no danger of lodging; but, even so, the poor yield of seed would be a very definite drawback.

**Stormont Gossamer** yielded well at Drouin and Newlyn, but it has the same drawbacks as Stormont Cirrus, and its extended use is not recommended without further trial.

**Liral Crown** performed creditably at all centres, being second at Leongatha, third at Drouin and Newlyn, equal third at Warncoort, and fifth at Strathkellar. In view of the known performance of this variety over the past few years, and to the fact that it yields a reasonable amount of seed as well as producing a high quality fibre, it would appear to be the best type for general sowing in Victoria. It is described officially as an early maturing strain producing relatively short straw (i.e., compared with "J.W.S.", a variety much grown in Northern Ireland), with good standing properties suitable for sowing on rich soils on which an over-rank growth of flax straw is likely to be produced.

In Northern Ireland, **Liral Monarch** is regarded as of equal merit with Liral Crown. Over the last two seasons in this State, it would appear that Liral Monarch is shorter strawed than Liral Crown, and slightly earlier in maturity, and at four of the five centres in 1938 it was a shade lighter in yield than Liral Crown. It may have its use in districts where Liral Crown is inclined to grow too tall with the consequent danger of lodging.

**Latvian** yielded surprisingly well considering its appearance. It is a rather short straggling variety which produces more seed than the newer flaxes from Northern Ireland. It does not appear to be a pure strain, in that it has long and short strawed plants, and early and late maturing ones growing together. For this reason, it would not be a desirable strain from the flax millers' point of view.

**Liral Dominion** proved to be a later variety than Liral Crown—not as late as Blue Riga, but almost as late as Giza Purple. It is described in Northern Ireland as a tall very late variety, resembling Stormont Cirrus in many of its characteristics, suitable for sowing on heavy soils or on those in poor to medium condition. It was not well suited by the season which dried out before it had made sufficient growth.

**Giza Purple,** which had performed so well in 1937, disappointed at all centres, but this could be put down entirely to the season which was so much against the late varieties. It is still considered, however, that Giza Purple has a place in flax growing in Victoria, that is, for early sowing in districts where it might be expected that Liral Crown would grow too tall and lodge. It produces a large percentage of seed, and the fibre produced from the 1937 crop was of excellent quality.

**Blue Riga** performed very poorly under the dry conditions—it was last at four of the five centres and second last to Latvian at Leongatha. It is definitely not a fibre variety, and could scarcely be considered even a dual purpose variety, for while it does yield a high percentage of seed, the quantity of fibre produced is low and of poor quality. This variety, which has been grown here under the name of "Blue Riga" or "Blue-flowering Riga," is reputed to have been introduced here from New Zealand where linum flax has been grown in the past as a linseed crop; and this bears out the contention that our Blue Riga is a linseed type and not a fibre type. Compared with the genuine Riga strain grown at Drouin in 1937 and at Warncoort in 1938 from seed imported from Riga in Latvia, our so-called Blue Riga is much shorter in the straw, much slower growing, and much later in maturity than the genuine strain. The imported Riga flax is more like Liral Crown in its general characteristics, but sufficient seed has not been built up yet to test its yielding ability.

The yields are set out in Table II.:—

TABLE II.—AVERAGE YIELD OF VARIETIES SOWN IN 1938.

| Variety. | Drouin. | Leongatha. | Warncoort. | Strathkellar. | Newlyn. |
|---|---|---|---|---|---|
| | cwt. per acre | cwt. per acre | cwt. per acre | cwt. per acre | cwt. per acre |
| Stormont Cirrus .. | 28·4 | 25·5 | 19·3 | 43·9 | 13·4 |
| Liral Crown .. | 20·4 | 23·2 | 18·8 | 33·4 | 13·6 |
| Stormont Gossamer | 25·2 | 21·8 | 18·4 | 37·1 | 14·8 |
| Latvian .. | 20·0 | 20·9 | 19·1 | 38·2 | 14·3 |
| Liral Monarch .. | 19·1 | 22·5 | 18·4 | 39·1 | 12·7 |
| Liral Dominion .. | 18·4 | 22·5 | 18·8 | 29·6 | 12·9 |
| Giza Purple .. | 17·3 | 22·1 | 14·3 | 30·5 | 12·5 |
| Blue Riga .. | 11·4 | 21·1 | 13·4 | 20·7 | 7·5 |

### *Rate of Seeding Trials.*

Four different rates of seeding were tried viz., 50, 70, 90 and 110 lb. per acre. The 50 lb. per acre sowing produced sparse looking brairds compared with the normal 70 lb. per acre, while the 90 and 110 lb. per acre sowings produced very thick stands of flax. These differences were still discernible at harvest time, although the light seeded plots had filled out to a certain extent, not by stooling out as with wheat or oats, but by increasing the thickness of the individual stems, whereas the heavier seeded plots had produced fine straw.

TABLE III.—RATE OF SEEDING TRIAL.

| Sown with Liral Crown. | Drouin. | Leongatha. | Warncoort. | Strathkellar. | Newlyn. |
|---|---|---|---|---|---|
| | cwt. per acre | cwt. per acre | cwt. per acre | cwt. per acre | cwt. per acre |
| 50 lb. per acre .. | 17·9 | 21·3 | 18·9 | 43·0 | 14·8 |
| 70 lb. per acre .. | 20·2 | 21·8 | 20·6 | 46·6 | 14·3 |
| 90 lb. per acre .. | 21·3 | 24·3 | 22·5 | 48·5 | 13·6 |
| 110 lb. per acre .. | 21·1 | 23·9 | 21·2 | 52·7 | 14·3 |

The results (see Table III.) show a tendency for an increase in yield from 50 lb. per acre to the heavier rates of seeding, but at three of the centres there was a slight falling-off in yield with the 110 lb. rate. There are two limiting factors which must be considered, however, when the rate of seeding is increased—one is the high cost of seed, and the other is the risk of the crop lodging when the seed is sown heavily.

TABLE IV.—COMPARISON OF RETURN PER ACRE FOR VARIOUS RATES OF SEEDING AT WARNCOORT, 1938.

| Rate of Seeding. | Yield. | Gross Return per Acre with Flax at £5 per Ton. | Cost of Seed at £1 per Bushel. | Return per Acre less Cost of Seed. | Difference in Return due to Extra Cost of Seed. |
|---|---|---|---|---|---|
| | (cwt./ac.) | £ s. d. | £ s. d. | £ s. d. | |
| 50 lb./ac. | 18·9 | 4 14 6 | 0 17 10 | 3 16 8 | .. |
| 70 lb./ac. | 20·6 | 5 3 0 | 1 5 0 | 3 18 0 | Gain 1s. 4d. per acre |
| 90 lb./ac. | 22·5 | 5 12 6 | 1 12 2 | 4 0 4 | Gain 3s. 8d. per acre |
| 110 lb./ac. | 21·2 | 5 6 0 | 1 19 3 | 3 6 9 | Loss 9s. 11d. per acre |

In most cases the value of the increase in yield from 50 lb. to 90 lb. per acre is more than sufficient to pay for the extra cost of the seed required (e.g., see Table IV.), so it then becomes a matter of sowing as much seed up to 90 lb. per acre, which is considered safe from the lodging aspect. Although the growth in 1938 was insufficient to give a check on this question, most experienced growers consider 65 to 70 lb. per acre to be the safe limit, the lighter quantity being used on rich land which produces a heavy rank growth.

### *Method of Sowing.*

The three methods of sowing employed were normal shallow drilling in 7-inch rows, deep drilling in 7-inch rows, and surface broadcasting of seed. An excellent scatter was obtained in the broadcast plots by removing the tubes from the drill and so allowing the seed and super. to fall from the level of the grain box to the ground, which was then lightly harrowed. These surface broadcast plots were the first to show up, and the hallow sowings (approximately ½ an inch) had also germinated well when inspected in August. The deep sowings (1½ inches to 2 inches) were slower in coming through, although they subsequently produced more or less normal brairds except at Warncoort where the seed was sown very deeply indeed—probably 2½ inches deep—and a thin stand had resulted.

As the season progressed, this very deeply drilled flax remained greener than that normally drilled, and the plants became thick and coarse. It was noticeable that a more even growth was obtained with the broadcast plots compared with those drilled normally, but when harvested there was practically no difference in yield between them at Drouin, Leongatha and Warncoort. While there was a slight decrease in yield with deep drilling at Drouin and Leongatha, this decrease was quite appreciable at Warncoort, where the germination had been affected. At Newlyn and Strathkellar, there were slight differences in favour of drilling in 7-inch rows as against broadcasting, but, taking the results as a whole, there would appear to be no great disadvantage in either broadcasting or in drilling in 7-inch rows, provided the seed is not drilled so deeply that germination is affected, as was the case at Warncoort. The results are tabulated in Table V.

TABLE V.—METHOD OF SOWING TRIAL.

| Method. | Drouin. | Leongatha. | Warncoort. | Strathkellar. | Newlyn. |
|---|---|---|---|---|---|
| | cwt. per acre | cwt. per acre | cwt. per acre | cwt. per acre | cwt. per acre |
| Drilled shallowly in 7-inch rows .. | 20·9 | 20·4 | 20·0 | 43·8 | 13·4 |
| Drilled deeply in 7-inch rows .. | 19·8 | 19·6 | 16·6 | 44·6 | 13·2 |
| Broadcast .. | 21·3 | 20·5 | 19·8 | 40·7 | 11·3 |

*Showing patchy germination of flax due to deep sowing and dry weather.*

### *Manurial Trials.*

When the plots were inspected in August, no difference could be seen between the various manurial treatments at Newlyn, but at each other centre there was a definite response to manure. For example, at Leongatha, the "No Manure" plots were short and thin, the plants being 2 inches to 2¼ inches high; the super. 1 cwt., super. 2 cwt., and super. 1 cwt. + potash ½ cwt. treatments were represented by full plots 3½ inches high; while the super. 1 cwt. + ammonia ½ cwt. plots were most forward, the plants measuring up to 5 inches, and swaying about in the wind with a drooping head.

While the responses were not quite so marked at the other centres, the "No Manure" plots were definitely the most backward, with the super. + ammonia the most forward. These responses were maintained in October, although at Newlyn there was still no difference apparent between the treatments. At Strathkellar, the difference in growth between the manured plots and those without manure was quite spectacular at this stage—the "No Manure" plots being but 20 inches to 22 inches high with the bud just showing, while the supered plots were 34 inches to 36 inches high and well in flower. At Warncoort, Leongatha and Strathkellar, the addition of sulphate of ammonia to superphosphate had promoted bulkier growth than with super. alone, but no difference was discernible at any centre with the addition of potash.

The results as set out in Table VI. show that the early responses to the various manures were reflected in the yields at harvest time. At each centre the dressing of 1 cwt. of superphosphate gave an increase in yield—the difference at Strathkellar being most striking. With a further cwt. per acre (i.e., 2 cwt. per acre) of superphosphate, there was a tendency for a slight further increase, the exceptions being Newlyn and Leongatha.

The early promise of the super. and ammonia dressings was maintained to harvest time at Strathkellar, and to a slight extent at Leongatha, but not elsewhere. Even where it does give an increase in growth, the use of sulphate of ammonia entails a risk of the crop growing too bulky and lodging, and this must be guarded against. The use of sulphate of ammonia, therefore, cannot be recommended in the normal flax-growing districts.

The addition of muriate of potash to superphosphate did not give any increase in the yield of straw, but from overseas experience it would appear that potash helps to keep the straw supple, and so lessens the tendency to lodge. It is said also to influence favorably the yield, strength and industrial value of the fibre, but until this has been proved under our conditions, the use of potash cannot be recommended. In general,

therefore, it would appear that 1 cwt. per acre of superphosphate would be the most suitable and profitable fertilizer to use. The actual yields are tabulated in Table VI., and in Table VII. are set out the monetary returns per acre from the various dressings of fertilizer at Leongatha, which has been taken as a type.

TABLE VI.—MANURIAL TRIALS, 1938.

| Treatment. | Drouin. | Leongatha. | Warncoort. | Strathkellar. | Newlyn. |
|---|---|---|---|---|---|
| | cwt. per acre | cwt. per acre | cwt. per acre | cwt. per acre | cwt. per acre |
| No Manure .. | 20·5 | 18·0 | 16·6 | 37·9 | 11·8 |
| Super. 1 cwt. .. | 22·7 | 20·5 | 18·0 | 49·5 | 12·3 |
| Super. 2 cwt. .. | 23·8 | 20·5 | 18·2 | 53·4 | 12·1 |
| Super. 1 cwt. + Sulph. of Amm. ½ cwt. .. | 22·5 | 21·6 | 17·0 | 57·1 | 12·5 |
| Super. 1 cwt. + Muriate of Potash ½ cwt. .. | 22·7 | 19·6 | 17·9 | 49·5 | 11·8 |

It is interesting to record that in connexion with the zinc sulphate trials being carried out in the Wimmera at Longerenong and Salisbury, flax showed a definite response to zinc sulphate, in that it increased the growth and hastened the maturity. The yields of the observation plots at Longerenong were not recorded, but at Salisbury the actual yields obtained with the variety Liral Crown were :—

Super. 1 cwt. .. 14.4 cwt. per acre
Super. 1 cwt. + Zinc sulphate 20 lb. .. 18.7 „ „

Considering the dry season, these yields with Liral Crown, and the response to zinc sulphate are indeed interesting.

TABLE VII.—SHOWING COMPARISON OF RETURNS PER ACRE FROM VARIOUS DRESSINGS OF FERTILIZER AT LEONGATHA.

| Treatment. | Yield. | Gross Return per Acre with Flax at £5 per Ton. | *Cost of Manure per Acre. | Return per Acre less Cost of Manure. | Difference in Return per Acre Due to Manure. |
|---|---|---|---|---|---|
| | cwt./ac. | £ s. d. | s. d. | £ s. d. | s. d. |
| No Manure .. | 18·0 | 4 10 0 | .. | 4 10 0 | .. |
| Super. 1 cwt. .. | 20·5 | 5 2 6 | 3 6 | 4 19 0 | 9 0 gain |
| Super. 2 cwt. .. | 20·5 | 5 2 6 | 7 0 | 4 15 6 | 5 6 gain |
| Super. 1 cwt. + Sulph. of Amm. ½ cwt. .. | 21·6 | 5 8 0 | 10 6 | 4 17 6 | 7 6 gain |
| Super. 1 cwt. + Muriate of Potash ½ cwt. | 19·6 | 4 18 0 | 10 4 | 4 7 8 | 2 4 loss |

* Cost of Manures—
Super. £3 15s. per ton;
Super. + Ammonia 2 : 1 Mixture £7 5s. per ton;
Muriate of Potash £13 7s. 6d. per ton.
All plus 5s. per ton freight, less 10s. a ton fertilizer subsidy.

## *Time of Sowing Trials.*

In European countries flax is a "hundred day" crop, being sown in April–May and harvested in August–September whereas in Victoria it is sown in autumn or winter and harvested after some 180 to 220 days.

To investigate the behaviour of Liral Crown when sown later in the year Time of Sowing

*Portion of the manurial trial at Strathkellar, showing the effect of super. 2 cwt. per acre (left) compared with no manure (right).*

Trials were instituted at all centres except Newlyn, although there, through the interruption by rain at the end of May, there was a comparison between late May and mid-June sowings. Single plots were sown in June, July and August at Strathkellar and Leongatha, and duplicate plots in June, July, August and September at Drouin and Warncoort. The differences noted at Leongatha on 29th August were typical of all centres—the August sowing had just shot, the July plot was up 1¾ inches, and the June plot up 3½ inches. At Drouin, the July sown plots were much more free from weeds than those sown in June, due to the extra cultivation following the wet month. In fact, the main plots sown in June at Drouin contained a fair proportion of wild oats which would have meant a lower price for the straw than the standard £5 per ton. These appeared as a vagary of the season, as the plot area had been well cultivated prior to sowing.

By the middle of October, it could be seen that the late sowings would fail unless good rains fell. At this period at Drouin, when the June sown plots were 22 inches high with the bud just showing, the July sown plots were 14 inches high, the August sown 6 inches, and the September plots 2 inches high. This was typical of the differences at Strathkellar, Leongatha and Warncoort although an attack by the red-legged earth mite at the lastnamed centre had spoilt the trial from a yield point of view with sufficient flax left only for observational purposes. It is of interest to record that while the July and August sown plots were attacked by the mites working progressively in from the edge of the paddock, the plots sown in September were quite free from attack. This may have been due to the fact that the area was dusted with a nicotine creosote dust and ringed with creosote in an effort to check the mite, or may have been merely a seasonal effect, in that the mites were normally becoming less active.

At harvest time, the flax sown in June and July at Drouin was comparatively good, whereas that sown in August was practically a failure, with the September sown flax not worth harvesting. This was rather typical of all centres as may be seen from the results in Table VIII.

As far as flax was concerned, 1937 and 1938 were entirely opposite seasons. In 1937 the flax made excellent growth, and grew so tall and luxuriantly that in some cases it lodged. In 1938, the season was so dry that the crops were struggling for length, and in every case the earliest sown flax stood up well and returned the greatest bulk of straw. This 1938 season was quite abnormal, and seasons of the 1937 type must be expected. This means that, while the aim of the grower is to produce the biggest possible tonnage, the risk of the crop lodging when sown too early must not be overlooked. It would seem that June and early July, depending on the district, would be the best time to sow Liral Crown to secure good yields, and at the same time lessen the risk of the crop lodging, although on some of the lighter land, May sowing would not be attended with undue risk of lodging. In certain favorable seasons, late sowing (August) might produce good crops of Liral Crown, but the risk of crop failure would appear to be rather too great, especially when it is considered that good safe crops can be obtained by sowing earlier.

TABLE VIII.—TIME OF SOWING TRIALS WITH LIRAL CROWN, 1938.

| Time of Sowing. | Drouin. | Leongatha. | Warncoort. | Strathkellar. | Newlyn. |
|---|---|---|---|---|---|
| | cwt. per acre | cwt. per acre | cwt. per acre | cwt. per acre | cwt. per acre |
| May sown .. | No plot | No plot | Yields not | No plot | 15·2 |
| June sown .. | 22·5 | 22·9 | avail- | 32·5 | 13·6 |
| July sown .. | 19·3 | 18·6 | able due | 26·1 | No plot |
| August sown .. | 8·9 | 12·9 | to mite | 14·3 | No plot |
| September sown .. | Nil | No plot | attack | No plot | No plot |

## *Time of Maturity Trial.*

A time of maturity trial was conducted on a bulk crop in the Warncoort district in an attempt to find the earliest stage at which flax could be harvested for fibre and yet still produce seed fit for sowing. Work on this trial, which entails an examination of the fibre and seed produced is in progress, and the results will be made available later.

## *Pests and Disease.*

Owing to the dry weather, there was practically a complete absence of rust in all Victorian crops in 1938. Only small wilty areas were noticed, but this should not lull growers into a false sense of security. Overseas experience is that where flax is grown too often on the same land, the soil becomes "flax sick" due to the presence of "Flax Wilt"—a disease caused by the fungus *Fusarium lini*. Flax, therefore, should be grown in rotation with other crops, and not planted on the same land more often than once every four or five years.

In the Strathkellar and Colac districts, some damage was caused by the Red Legged Earth Mite (*Halotydeus destructor*), an insect practically identical with the Pea Mite (*Penthaleus bicolor*), but sometimes wrongly called Red Spider. The mites make their appearance early in April—having hatched from eggs which were laid towards the end of November. These young mites have dull red bodies and only six legs, but they develop through several moults occupying a period up to 40 days into fully grown adult mites. In this stage the mite measures about 1/25th of an inch in length, with the body of a dense velvety black colour, and with eight red legs. During the winter, these adult mites lay their eggs either on the soil or on the leaves of food plants, and these hatch over a period of from seven to fourteen days. There are several generations or broods of these mites in a year, and towards the end of November, summer eggs are laid by the thousands about the surface of the soil, under clods, dry weeds, or rubbish. These eggs are extremely resistant to heat, drought and desiccating winds; and the moisture and mild warmth of autumn are necessary before they will hatch.

The Earth Mite attacks flax crops in two ways—where the paddock itself is clean, the mite may work in from the edge and destroy perhaps one or two drill widths of crop out from the fence. More serious attack occurs when a pasture paddock on which the mites have been feeding is ploughed late in the season and sown with flax soon afterwards. The fallow period has not been sufficiently long to starve out the mites, which then attack the flax as it comes through the ground, and in some cases wipe out the whole crop. The mites seem particularly fond of the young plants in the cotyledon stage; but once the plant throws up its stem and commences to grow, it seems to be past the susceptible stage and escapes attack.

Control methods (such as dusting with nicotine and creosote dusts) when the mites are present in large numbers throughout a young crop would appear to be too costly, so preventive measures must be adopted. Flax, therefore, should follow another crop such as wheat or millet, neither of which is very susceptible to attack. If it is necessary to follow pasture with flax, the paddock should be ploughed as early in the year as possible, and then well cultivated to starve out the mites as they hatch. The practice of ploughing up pasture land in infested districts and immediately working it up and sowing flax should be avoided at all costs. Experienced growers sometimes leave a strip unsown round their flax crop sufficient to take a cultivator, while others sow a round or two of oats or some other crop before sowing flax. Both these methods will help to prevent an invasion from neighbouring pasture paddocks; but as pointed out above, steps must be taken earlier than this if the paddock itself is infested.

Cutworms which were prevalent in crops at Colac, Leongatha and Drouin were all identified as the "Common climbing cutworm"—although they varied extensively in size and colour. They damage flax crops by boring a circular hole in the boll and eating out the seed completely. Their life history may be summarized as follows:—

The cutworm moths which may be seen flying about in September lay eggs on something green. The eggs hatch out fairly quickly into the grub which grows in size as it feeds on the flax seed, and later spins a cocoon about half an inch underground. These pupae hatch out into moths which lay the eggs, and so the cycle goes on with perhaps two generations in one year. It is the same type of cutworm which attacks oats by nipping the heads off the crop. Their severity is seasonal, and there is no practical control at present.

## *SUMMARY.*

### *The Season.*

The 1938 season was more or less normal up to sowing time, but then dried out to such an extent that only the early sown crops grew to standard length, and all crops dried out early in the season instead of maturing normally.

### *Varieties.*

Stormont Cirrus was the outstanding variety in 1938; but its use is not recommended because of its tall growing habit and consequent possibility of lodging. Liral Crown performed creditably, and appears to be the most suitable variety for general sowing, with Giza Purple useful under certain conditions.

### *Rate of Seeding.*

Sowing at 65–70 lb. per acre is considered the most economical rate, in view of the possibility of heavier seeded crops lodging in good seasons, and the fact that lighter seeding produces sparse crops with a consequent yield reduction.

### *Method of Sowing.*

There is no definite superiority, one way or the other, with broadcasting or with drilling in 7-inch rows, provided the seed is not buried too deeply when drilling.

(*Continued on page 203.*

# Victorian F.A.Q. Wheat

## Analysis of 1939 Sample

*By W. R. Jewell, M.Sc., Agricultural Research Chemist*

IN spite of the adverse season, which materially reduced yields, this season's F.A.Q. wheat sample is remarkably good in appearance. The grain is reasonably plump and quite bright and the amount of foreign material is lower than it has been for a number of years. No bleaching or weather damage was in evidence. In addition to its pleasing appearance, this season's wheat shows a number of remarkably good features. It is already well-known that the bushel weight has been struck at 64½ lb. which is understood to be an all-time record. What is also of importance is the fact that the protein content of the wheat, and consequently the gluten content of the flour, is exceptionally high—much higher than in any previous year in the memory of the writer. These statements are based on the results of the usual examination, analysis and milling and baking tests conducted on portion of the official F.A.Q. sample, made available by the courtesy of the Chamber of Commerce. While these improvements in quality are due to some extent to seasonal effects, they are also in part due to the improved types of wheat now grown.

### *Wheat.*

Analytical results on the wheat are given in Table I., those for some years past being included for comparison.

The moisture content, due to seasonal effects, is lower than previously recorded. Screenings, which includes broken grain and grain less than 2 m.m. in addition to some husk, backbone, and weed seeds, is at a very satisfactorily low figure. As already mentioned, the protein content is exceptionally high, thus ensuring a very high gluten content in flour milled from it.

TABLE I.—ANALYTICAL RESULTS—WHEAT.

| | 1932. | 1933. | 1934. | 1935. | 1936. | 1937. | 1938. | 1939. |
|---|---|---|---|---|---|---|---|---|
| Moisture (per cent.) | 9·31 | 10·59 | 10·89 | 11·84 | 12·2 | 12·70 | 11·8 | 9·09 |
| Impurities (screenings) (per cent.) | 6·7 | 8·7 | 4·8 | 8·6 | 4·9 | 4·5 | 5·3 | 3·4 |
| Ash (per cent.) | 1·41 | 1·39 | 1·36 | 1·61 | 1·41 | 1·34 | 1·30 | 1·26 |
| Protein (N x 5·7) (per cent.) | 9·66 | 9·35 | 9·53 | 10·93 | 9·74 | 9·80 | 11·09 | 12·81 |
| Bushel Weight (lb.) | 62¾ | 62 | 60 | 60 | 63½ | 62 | 63½ | 64½ |
| Pelshenke figure (mins.) | .. | .. | 24 | 24 | 26 | 24 | 28 | 36 |

TABLE II.—ANALYTICAL RESULTS—FLOUR.

| | 1932. | 1933. | 1934. | 1935. | 1936. | 1937. | 1938. | 1939. |
|---|---|---|---|---|---|---|---|---|
| Moisture (per cent.) | .. | .. | .. | .. | .. | .. | .. | 11·11 |
| Yield (per cent.) | 72·8 | 73·2 | 72·8 | 71·7 | 73·6 | 71·3 | 73·8 | 71·3 |
| Ash (per cent.) | 0·56 | 0·49 | 0·51 | 0·56 | 0·48 | 0·59 | 0·48 | 0·54 |
| Protein (N x 5·7) (per cent.) | 8·65 | 8·02 | 8·79 | 9·39 | 9·00 | 9·12 | 9·92 | 11·17 |
| Wet Gluten (per cent.) | 26·1 | 22·4 | 23·1 | 26·8 | 27·4 | 26·4 | 30·4 | 38·7 |
| Dry Gluten (per cent.) | 8·7 | 7·6 | 7·9 | 9·1 | 9·1 | 8·4 | 9·9 | 12·2 |
| Water Absorption (per cent.) | 50·6 | 50·6 | 50·6 | 50·6 | 50·0 | 50·25 | 50·6 | 50·0 |
| Maltose Figure | .. | 141 | 195 | 84 | 159 | 142 | 152 | 168 |

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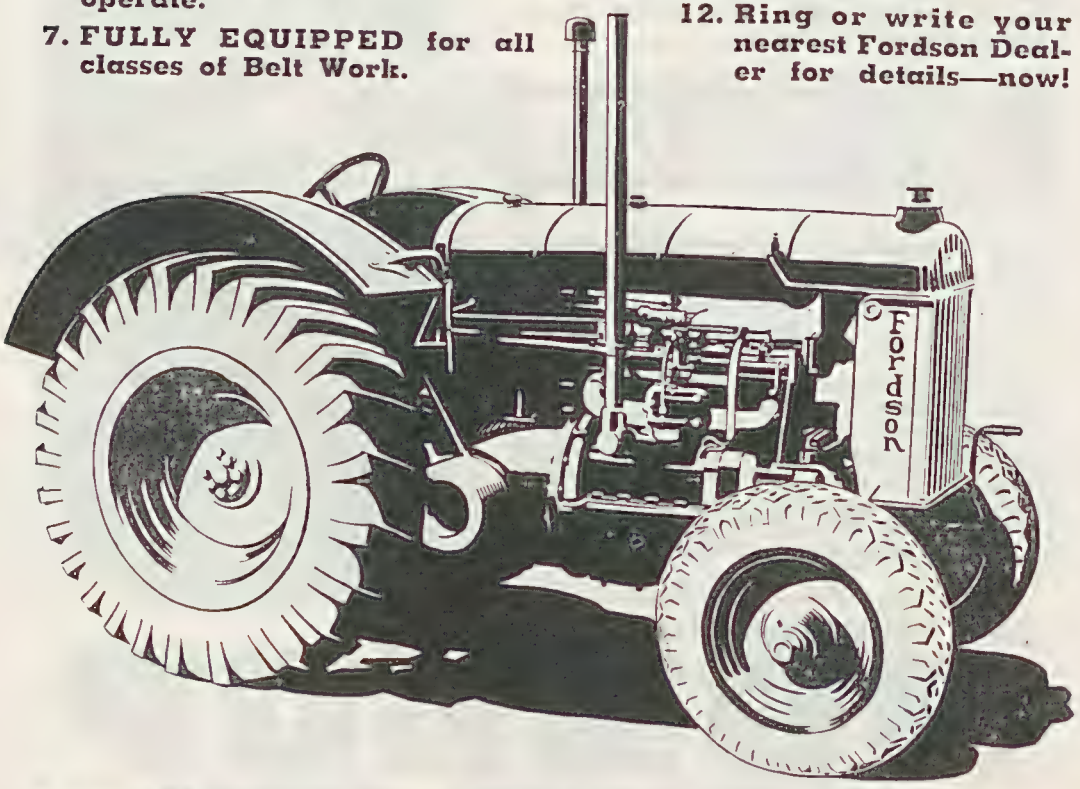


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### *Flour.*

The wheat milled easily on the experimental flour-mill with a normal yield of flour (slightly lower than last year). Analytical data are given in Table II.

The exceptionally high figures for glutens and protein should be noted. The diastatic capacity, as measured by "maltose figure" is normal for a dry season, but is lower than is desirable to ensure adequate gassing power. This is confirmed by baking tests in which malt and phosphate are added ingredients.

In spite of the increased protein content, the Farinograph diagram for the flour from this season's F.A.Q. wheat is not markedly superior to that of last year. It does show an improvement and indicates a longer mixing time and a reasonable degree of fermentation tolerance. The results of experimental baking tests are particularly interesting this season. They show, firstly, that the baking quality of the flour without any additions is not so great as would be expected and, secondly, that, for the first time for many years, the loaf is materially improved by the addition of potassium bromate. The results with "pup" loaves are given in the following table.

Baking Tests (100 grm. flour).

| Procedure. | Loaf Volume (c.c.). | | |
|---|---|---|---|
| | 1937. | 1938. | 1939. |
| Basic .. .. .. | 395 | 450 | 397 |
| Basic + malt + phosphate .. | 440 | 510 | 475 |
| Basic + malt + phosphate + bromate .. .. | 385 | 490 | 517 |

The basic loaf was small and rather stodgy, but had a good texture. The loaf with malt and phosphate had a decidedly larger volume with a more open, but satisfactory texture. A still further marked improvement is obtained with the addition of bromate, when a very good loaf, of good external appearance and satisfactory texture, is obtained. This indicates that this season's flour will improve on ageing and that mineral improvers, as well as yeast foods, are likely to be necessary to get best results. It is considered that the flour will, when properly handled, prove very satisfactory to the baker and be better than for years past.

As a result of the high protein content of the wheat, both bran and pollard are higher in protein than usual, thus enhancing the feeding value of these by-products. Both bran and pollard produced in the experimental milling contained over 17 per cent. of crude protein.

# *Tomato Culture*

(*Continued from page* 167).

they will not thrive in a wet soil. Tests with tomatoes from irrigated areas have revealed that over-irrigated fruit may contain only 3 per cent. solids, while the same variety, under correct treatment, would contain 6.3 per cent solids.

It is difficult to describe a standard which could be used as a guide to the desirable soil moisture content of a soil. The following might be an ideal to aim at, and convey some idea of this very important feature :—Although the soil should not be continually wet, it should never become so dry that it crumbles if squeezed together in the hand. Let us say "when not more than approximately 50 per cent. of the spaces between the soil particles are filled with water", or again may we liken it to a wet towel which has been "wrung out". Vagaries of climatic conditions will always play an important part, but if this idea is followed there will be fewer complaints from factories about watery tomatoes.

# Keeping Poultry Flocks Healthy

## The Importance of Green Feed

*By H. F. Clinton, Poultry Expert.*

NATURAL health and vigour are so important and so fundamental in a system of prevention of poultry diseases and parasites that every poultry keeper should endeavour to secure and maintain these conditions as the first step in the establishment of a successful poultry farm. Certain individuals are naturally more resistant to disease than others and such inherited vigour and vitality should be carefully considered in selecting birds for breeding purposes.

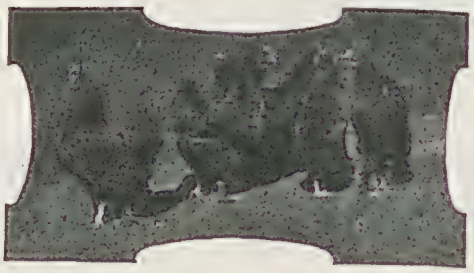
Just as important is the careful selection of eggs intended for hatching, the proper operation of the incubator, and the rearing of the chickens under ideal conditions. There must be no error during these operations if the future flock is expected to do well.

Correct feeding is an important factor in the prevention of disease. It is only reasonable to expect poultry to be very much more subject to disease when their rations are deficient in quantity and quality, or improperly balanced. It is necessary to feed a variety of foods in order to increase palatability and to maintain bodily health. A monotonous diet must be avoided. It has been found that some foods contain certain essential constituents necessary for the maintenance of health while they are deficient in other foods. This may be provided for by a combination of foods properly chosen.

The value of fresh succulent green food can hardly be exaggerated; it is, indeed, a most important necessity on every poultry farm, and a continuous and varied supply must be provided. Not less than 5 to 6 lb. of chaffed green food should be supplied to every 100 adult birds daily.

The very dry conditions experienced recently have made it difficult for some poultry keepers to provide sufficient green food and this has had a detrimental effect on the health of the birds. A complaint very similar to roup in manifestation is due to a deficiency of vitamin A in the ration. Some of the symptoms of this complaint are weakness, a discharge from one or both nostrils which may be followed by a swelling of the face beneath the eyes, and a discharge from the eyes which may glue the eyelids together. A regular supply of fresh greens is the common method of supplying vitamin A to poultry. In the absence of green food it is strongly recommended that cod liver oil of good quality, which contains vitamin A, be included in the ration in the proportion of 1 to 2 lb. in each 100 lb. of mash. With the lowered condition of the stock, great care will be necessary during the late summer and autumn to prevent severe outbreaks of chicken pox.

The most rapid method by which infectious diseases of all kinds are transmitted through a flock of birds is by means of the drinking water. Therefore, a constant supply of fresh and clean water should always be at hand. Poultry hygiene is a very important consideration, and the surest and least expensive means of combating disease is to surround the flock with healthful conditions. The principle that prevention is better than cure should be realized, for it may mean all the difference between success and failure. With careful feeding, suitable environment, and good management, it should be possible to keep the poultry flock healthy.



# Dairy Farm and Clean Milk Competitions at Dumbalk

*Report of the Judges, Alex Mess, Senior Dairy Supervisor and G. R. Berryman, Dairy Supervisor.*

EVERYONE knows that sooner or later milk becomes sour, but there are many who do not know that this change is due to the presence of bacteria and that these bacteria multiply enormously when milk is not kept cool and free from dirt. Even fewer are aware that milk and cream tend to absorb flavours and, therefore, should be kept in a clean, fresh room where nothing else is stored.

*An interior view of the milking shed of Mr. J. Beattie, winner of the "25 cows and over" section. Note the small number of posts which facilitates cleansing.*

Methods by which the quantity of milk can be increased are often spoken of, but those by which the quality may be improved are not so frequently stressed. It is sometimes assumed that first class milk can come only from those places where modern plant has been installed. This is a mistake; every dairy where cleanliness is practised should be able to supply good milk, though, of course, it is always a difficult task to keep the badly-constructed buildings in a sanitary condition.

With the object of improving the quality of milk supplied to the Dumbalk Butter Factory, the management last year arranged to hold a Dairy Farm and Clean Milk Competition. It was so successful that it was decided to hold another competition this season.

The judging was done by supervisors of the Department of Agriculture, who made two inspections of the dairies of the competitors—the first in late spring and the second in January and February. During the second inspection milking methods were observed and a note made of the general sanitary conditions and the health of the cows. A sediment test from the bulk milk was taken at each farm and the result was particularly interesting to the competitors, as well as of great assistance to the judges.

For the recent competitions 27 farms were entered and much interest was shown. It was very pleasing to see the great improvement in many farms since the first competition, and some of last year's winners, while maintaining a high standard, were displaced from leading positions.

Prizes were offered for the Best Farm with 25 cows or over, and for the Best Farm with 24 cows or less. Prizes were also given for the highest aggregate number of points gained by any competitor and for the farm at which the cleanest wad was taken. In addition a Clean Milk Competition was conducted among boys and girls of eighteen years and under, and a prize was given for the best essay on the management of a dairy farm.

### *The Awards.*

The first prize for the best farm of 25 cows and over was won by Mr. J. Beattie, of Dumbalk—one of last year's unplaced competitors. He was also successful in gaining second prize for the highest number of aggregate points. Mr. Beattie is an English settler who spares no effort in trying to raise the best produce from his farm. A feature of particular interest there is a stripping-cup with which the fore milk of every cow is tested for mastitis.

On Mr. Beattie's farm there is a 200-ft. bore close to the milking shed, and from this, by means of an electric motor, water of a temperature of

58°F. is sent to the dairy buildings and cattle troughs. The cow-shed is of the gable type and the roof extends over the air passage separating the shed and the separator room.

The floors, receiving yards, and exits are all well graded and concreted. The interior of the shed and separator room are lime washed, and there is a 3-ft. tarred dado which is washable. A 6-ft. x 7-ft. cream room on a nice clean site is a guard against vermin and shed odours. Equipment includes stainless separator parts and tubes on milking plant, good washing troughs, and drying racks, and a boiler in a separate room. The second prize in this section was awarded to Mr. J. B. Yorke, of Milford Grange, who continues to maintain the high standard which won him first place last year. His shed is of the enclosed type, with high gable roof and graded concrete floor. Liberal use of concrete has overcome the mud problem in the yards and exits. A well-equipped detached separator room, with impervious concrete floors and wall plates on a raised 6-in. concrete base are convenient and easy to clean. The cream room is well away from all offensive odours and is in a shaded position. All separator parts are of stainless steel, as is also the milk line on the four-unit overhead plant. Equipment includes steam under pressure, drying racks, troughs, &c. All benches are covered with sheet galvanized iron which eliminates the danger of contamination, as may happen with wooden benches.

The prize for the best farm with 24 cows and under was won by Mr. L. J. Spencer, of Stony Creek—last year's winner in the same section. He was also successful in carrying off the award for the highest number of aggregate marks.

*Showing the concrete approach to Mr. L. J. Spencer's shed. Mr. Spencer won the "under 25 cows" section.*

Mr. Spencer's milking shed is of the skillion roof type. The separator room, which is open to the north, is apart from the milking shed; there is a 6-ft. space between. A barn is attached to the milking shed, but there is a dust-proof wall between, neatly constructed from car-packing cases. The buildings have a tarred dado and are lime washed. They are scrupulously clean at all times. In the wash room attached to the separator room there is ample equipment including copper, benches and troughs. All surfaces and receiving yards are well concreted. Open concrete drains extending 30 feet from the shed convey dirty water, &c., from the building. An 8,000-gallon underground tank provides plenty of clean water. All cream is cooled and then immediately removed to a well-ventilated cream room. It is 6 feet square; the walls and ceiling are of cement sheet, the floor is concreted and the roof is of galvanized iron. The buildings are enclosed by a fence so that stock may not approach them.

The second prize for the best farm of 24 cows and under was won by Mr. G. H. Bright, of Dumbalk. His cow shed has weatherboard walls and a galvanized iron roof, with concrete floor and drains.

*Several young trees have been planted around Mr. J. Beattie's cow yard.*

There is a detached separator room and apart from this is the wash room, equipped with copper, benches, &c. After cooling, the cream is taken to a 6-ft. x 8-ft. cream room, well ventilated and some distance from the cow shed, and fenced off from stock. The walls and ceiling are of weatherboards and the floor is of concrete. The water supply is obtained from the shed roof and is stored in galvanized iron tanks.

The prize for the cleanest wad (sediment test) went to Mr. B. Fitzgerald, of Dumbalk, and the second prize to Mr. J. Trease, of Dumbalk North. The dairy sanitation at the farms of both Messrs. Fitzgerald and Trease is excellent and it will be difficult to displace them from the positions they won in this year's competition.

The Clean Milking Competition for boys and girls was conducted on the farm of Mr. L. J. Spencer and was won by Heather Hancock; second place was awarded to Kathleen Jones, and the third to Alice Ayton. There were nine competitors. The essay prize was won by Stanley Hemming; second and third prizes went to Joan Cooper and Reg. Lockwood respectively.

The competition was concluded by a Field Day at the Dumbalk Recreation Ground, when the various prizes were presented to the winners by the Hon. T. Paterson, M.H.R. Addresses were given by Mr. J. M. Kerr, Superintendent of Dairying, on Dairy Sanitation; by Mr. Sandow, of the Electricity Commission, on Electricity on the Farm; and by Mr. N. A. Wellington, Veterinary Officer of the Department of Agriculture, on Stock Diseases. Later in the day some of the winning farms were visited and brief lectures were given there by Mr. Kerr and Mr. R. L. Twentyman.

# *Flax for Fibre*

*(Continued from page 197.)*

### *Manurial Treatment.*

Super. 1 cwt. would appear to be the most suitable fertilizer—heavier dressings or the addition of Sulphate of Ammonia may produce bulky crops which would lodge under certain conditions. Potash (applied as Muriate) has not yet shown to advantage.

### *Time of Sowing.*

Sowing in June and early July is recommended. Earlier sowing in rich soil is attended by the risk of the crop lodging, and later sowing in August and September may seriously reduce the yield.

### *Pests and Disease.*

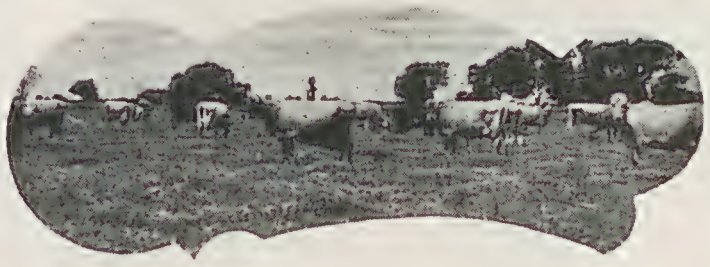
Flax should not be sown too often on the same land because of the danger of "Flax Wilt". In Pea Mite or Earth Mite areas, care should be taken to prepare the ground early and give thorough cultivation to starve out the mite before the flax is sown.

### *Acknowledgment.*

The Experimental Plots in 1937 and 1938 were located on the following properties:—

| | | |
|---|---|---|
| Drouin | .. | Mr. G. M. Mitchell |
| Leongatha | .. | Mr. A. G. Frank |
| Warncoort | .. | Mr. A. H. Currington |
| Strathkellar | .. | Mr. R. W. C. Kerr |
| Newlyn | .. | Mr. Howard Yelland. |

Without the close co-operation of the growers concerned both with Flax Fibres Pty. Ltd. and with the Department of Agriculture, the experimental work would not have been possible.



# Licensed Skin Buyers

## Sheep Owners Protection Act

Following is a list of persons licensed under the Sheep Owners Protection Act to buy raw sheep skins. The licences have effect until the 31st December, 1939.

| Licence No. | Name. | Address. |
|---|---|---|
| 788 | Allan, J. R. .. | 19 King-street, Melbourne |
| 789 | Angliss, W. and Co. | 42 Bourke-street, Melbourne |
| 790 | Archibald Bros. .. | Beulah |
| 901 | Armstrong, F. J. .. | 56 Cutter-street, Burnley |
| 902 | Armytage and Boyd | Lloyd-street, Kensington |
| 948 | Austin and Ford .. | Hopetoun |
| 791 | Banks, C. L. .. | Barkly-street, Ararat |
| 970 | Bannon, W. J. .. | St. Arnaud |
| 781 | Barrett, H. L. .. | Bond-street, Sale |
| 889 | Barry, A. T. H. .. | Main-street, Minyip |
| 875 | Bartlett, A. E. .. | High-street, Echuca |
| 812 | Beck, E. H. .. | Murrayville |
| 966 | Bendigo Wool and Fertilizer Co. Pty. Ltd. | Bendigo |
| 828 | Bennett, S. C. .. | 71 Isabella-street, Geelong West |
| 921 | Biggs, H. A. .. | Korumburra |
| 928 | Black, S. B. P. .. | Streatham |
| 940 | Block, L. N. .. | Wodonga |
| 853 | Blundell, A. .. | 236 Barkly-street, Footscray |
| 913 | Bond, W. E. R. .. | Antwerp |
| 829 | Borthwick, T. and Sons | 84 William-street, Melbourne |
| 890 | Bourke, D. .. | 89 Cox-street, Hamilton |
| 876 | Brabinder, L. C. .. | 6 Redan-street, St. Kilda |
| 930 | Bridges, T. .. | 1115 Ligar-street, Ballarat North |
| 854 | British and Eastern Wool Co. | 80 Errol-street, North Melbourne |
| 941 | Brookes, E. J. .. | Quambatook |
| 847 | Bunn, W. G. .. | Warragul |
| 782 | Burns and McCleave | 206 Mair-street, Ballarat |
| 931 | Burrows, A. .. | Kerang |
| 845 | Burt, R. and Co. .. | Euroa |
| 792 | Burton Stores Pty. Ltd. | Euroa |
| 793 | Butler, E. and Sons | Tallangatta |
| 855 | Byerley, H. M. .. | 15 Grandview-grove, Toorak Gardens, Adelaide, S.A. |
| 830 | Callan, P. J. and Son | 6 Moorabool-street, Geelong |
| 856 | Canfield, E. .. | Rochester |
| 794 | Cass, R. .. .. | Chetwynd |
| 891 | Clark, J. .. | Hamilton |
| 969 | Clarke, J. T. .. | Horsham |
| 891 | Clarke, W. J. .. | Ouyen |
| 813 | Collins, H. G. .. | Kaniva |
| 877 | Cook, T. J. .. | Black-street, Terang |
| 795 | Cook, W. J. .. | Allansford |
| 857 | Cooke, E. J. .. | Murrayville |
| 959 | Cooper, A. S., Pty. Ltd. | 87 Lambeth-street, Kensington |
| 831 | Coulstock, T. .. | Kyabram |
| 892 | Curran, J. M. .. | Annuello |
| 814 | Curry, T. .. | St. Arnaud |
| 796 | Dallimore, P. J. .. | 23 Nelson-street, Colac |
| 783 | Delfendahl, O. .. | Box 34, Orbost |
| 810 | Dent, B. C. .. | Delegate |
| 832 | Devine, P. and Co. | McDonald-street, Numurkah |
| 858 | Dimboola Stores .. | Dimboola |
| 859 | Dlug, I. .. .. | 477 Canning-street, Carlton North |
| 932 | Dobbie, H. W. .. | South Calivil |
| 933 | Douglas, D. .. | Stuart Mill |
| 878 | Downes, A. .. | Wills-street, Dunkeld |
| 943 | Duggan, T. A. .. | Mollison-street, Kyneton |
| 879 | Edgecombe, J. .. | Sea Lake |
| 893 | Egan, B. F. .. | Portland |
| 922 | Egan, F. .. | Tanwood |
| 820 | Ellis, C. J. .. | Euroa |
| 934 | Ellis, J. M. .. | 39 Roberts-street, Essendon |
| 860 | Evans, C. J. .. | Hamilton |
| 903 | Evans, W. J. .. | Boort |
| 827 | Fanning, M. .. | Colac |
| 951 | Ferguson, F. .. | Market Square, Bendigo |
| 935 | Ferris, M. M. .. | Box 90, Warrnambool |
| 861 | Ferris, R. L. .. | P.O., Langley |
| 946 | Fookes, M. D. .. | 166 Amess-street, North Carlton |
| 914 | Freeman Bros. .. | Warracknabeal |
| 904 | Freeman, W. G. .. | Elmore |
| 848 | Fryberg, M. .. | Rushworth |
| 955 | Gelbart, D. M. .. | 20 Wilson-street, North Carlton |
| 923 | Gelbart, J. M. .. | 20 Wilson-street, North Carlton |
| 815 | Gilbert, F. C. .. | Charlton |
| 784 | Glazebrook, J. C. | Yarram |
| 816 | Godfrey, T. and Son | Stawell |
| 833 | Gordon, C. G. .. | 645 Spencer-street, West Melbourne |
| 950 | Gorton, C. H. .. | Alexandra |
| 905 | Gregory, T. K. .. | Murchison |
| 963 | Gross and Co. .. | 161 High-street, Echuca |
| 915 | Hardy, F. A. .. | Meyamyn |
| 964 | Hardy, J. H. .. | Port Fairy |
| 927 | Hargreaves, J. R. | 1 McDonald-street, West Preston |
| 797 | Hargreaves Bros. .. | Barkly-street, Ararat |
| 798 | Harper, W. .. | Alberton |
| 953 | Harris, A. J. .. | Warragul |
| 936 | Harris, L. .. | Rupanyup |
| 834 | Hase, H. .. .. | Omeo |
| 849 | Hassall, W. E. .. | Box 11, Rainbow |
| 799 | Haughton, W. and Co. | 545 Little Collins-street, Melbourne |

LICENSED SKIN BUYERS—*continued.*

| Licence No. | Name. | Address. |
|---|---|---|
| 780 | Hawking, K. .. | Kyabram |
| 862 | Hill, H. .. .. | Box 181, Warracknabeal |
| 817 | Hogan, A. P. .. | Tumbarumba, N.S.W. |
| 949 | Hould, R. J. .. | Byrne-street, Stawell |
| 880 | Howard, E. J. .. | Donald |
| 906 | Howlett, A. E. .. | Casterton |
| 881 | Hunting, G. .. | 1 Tiuna-grove, Elwood |
| 916 | Jackson, J. Pty. Ltd. | Bairnsdale |
| 800 | Jeffrey, J. .. | Echuca |
| 917 | Jobe, C. E. .. | Minyip |
| 835 | Johnson, A. P. .. | Lake Boga |
| 836 | Johnstone, W. .. | Casterton |
| 863 | Jones, E. V. .. | Harrow |
| 907 | Kelly, W. A. .. | Penshurst |
| 837 | Kennon, J. and Sons | River-street, Richmond |
| 850 | Kewin, R. F. .. | Box 13, Corryong |
| 965 | Khan, Bunna .. | Market Square, Bendigo |
| 838 | Khan, Rhoda .. | Maryborough |
| 918 | Kilroy and Story .. | Heathcote |
| 818 | Krew, Eli .. | 278 Rathdown-street, Carlton |
| 846 | Lindsay, D. .. | Jeparit |
| 864 | Lipton, F. .. | Cr. Byron and Cyril streets, Elwood |
| 839 | Lloyd Bros. and McGuinness Pty. Ltd. | 644 Bourke-street, Melbourne |
| 840 | Long, C. J. .. | 70 Westbrook-street, East Kew |
| 882 | McClintock, A. E. | Digby |
| 883 | McColl, D. .. | Tatura |
| 947 | McInnes, N. C. .. | 96 Shannon-avenue, Newtown |
| 809 | McIntosh, D. .. | Woomelang |
| 908 | McLean, A. and Son | Benalla |
| 841 | McLennan, D. .. | Wycheproof |
| 973 | McLennan, D. J. and Son | Sea Lake |
| 919 | McMillan, R. H. .. | Maffra |
| 884 | McNamara, F. J. | Box 31, Numurkah |
| 819 | Marshall, G. .. | Edenhope |
| 821 | Martin, H. .. | 299 Ross-street, Port Melbourne |
| 971 | Mitchell and Moorehead | Lilydale |
| 801 | Moir and Cary .. | High-street, Heathcote |
| 937 | Moore, D. R. .. | Kilmore |
| 972 | Murrells and McNicol | St. Arnaud |
| 865 | Niddrie, L. G. .. | Hamilton |
| 802 | North Western Wool and Skin Stores | Swan Hill |
| 909 | O'Beirne, J. and F. | Linton |
| 866 | O'Beirne, J. D. .. | Hamilton-street, Horsham |
| 938 | O'Brien, W. J. .. | 622 Stanley-street, Albury, N.S.W. |
| 920 | O'Keefe, K. P. and J. | 3 Girdwood-avenue, Carnegie |
| 867 | Patterson, D. D. .. | Nhill |
| 842 | Payne, A. .. | Box 89, Nyah West |
| 803 | Penny, H. and Son | 3 Balaclava-street, Ballarat |
| 967 | Perkins, C. T. .. | Naracoorte, S.A. |
| 968 | Perry, A. J. .. | Colac West |
| 924 | Petrie, J. .. | Buangor |
| 822 | Pettitt, R. .. | St. Arnaud |
| 823 | Phillips Co-op. Society | Minyip |
| 960 | Pincini, J. .. | Mirboo North |
| 895 | Pyramid Co.-op. Stores | Pyramid |
| 925 | Quarrell, C. .. | Cobden |
| 896 | Rasmussen, J. .. | Numurkah |
| 868 | Reason, C. .. | Pekin-road, Maryborough |
| 785 | Rehfisch and Co. .. | 223 Mair-street, Ballarat |
| 824 | Rice, J. W. .. | Welsford-street, Shepparton |
| 885 | Rice, W. .. | Bombala, N.S.W. |
| 897 | Rich, H. J. .. | Box 112, Geelong |
| 869 | Robbins, T. .. | Cohuna |
| 956 | Robertson, C. M. .. | Nathalia |
| 779 | Robinson, H. E. .. | 165 Glenhuntly-road, Elwood |
| 957 | Round, G. E. G. .. | Leslie Manor |
| 870 | Rowan, L. M. .. | Minyip |
| 898 | Ruedin, U. F. .. | 100 Moran-street, Bendigo |
| 939 | Russell, R. .. | Colac |
| 786 | Rutter, R. .. | 3 Johnston-street, Stawell |
| 926 | Scadden, A. J. .. | Middle Tarwin |
| 825 | Scott, A. B. .. | Stawell |
| 910 | Scott, F. .. | 22 Yaldin-street, Kyneton |
| 927 | Short, I. W. .. | Box 128, Hamilton |
| 811 | Simpson and Barber Pty. | Mildura |
| 843 | Sims Cooper and Co. | 499 Little Collins-street, Melbourne |
| 871 | Soulsby, G. .. | Inglewood |
| 943 | Sproal, H. M. .. | Macarthur |
| 844 | Stanton, J. .. | Nhill |
| 851 | Stapleton, J. .. | Nar Nar Goon |
| 894 | Stephens, J. .. | Colac |
| 911 | Stuart and Co. .. | 357 King-street, Melbourne |
| 944 | Sturgeon, E. T. .. | Maryborough |
| 787 | Tait, A. H. .. | Swan Hill |
| 804 | Taylor, H. .. | Birchip |
| 886 | Teasdale, R. L. .. | Charlton |
| 961 | Thomas, F. .. | Tintaldra |
| 872 | Timms, N. .. | Minyip |
| 826 | Vines, A. A. .. | Robinvale |
| 945 | Voges, A. V. .. | Ballarat-road, Hamilton |
| 958 | Walker, F. H. .. | Romsey |
| 899 | Waring, J. .. | 27 Skene-street, Hamilton |
| 808 | Warnock, R. .. | Yea |
| 900 | Waters, S. H. and Co. | Box 158B, Melbourne |
| 887 | Welsh, J. .. | 41 Mair-street, Ballarat |
| 807 | Westphalen, W. R. | Yaapeet |
| 806 | Wheaton and Brown | Miram |
| 888 | Wilkinson, G. R. .. | Manangatang |
| 852 | Wingfield, E. H. .. | Charlton |
| 954 | Wise, A. G. .. | 48 St. Fyans-street, South Geelong |
| 873 | Wood, H. L. .. | Balmoral |
| 805 | Wright, N. .. | 11 McCracken-street, Shepparton |
| 952 | Young, H. .. | Orford |
| 874 | Young, R. .. | 3 Burnley-street, Richmond |
| 912 | Zed, A. .. .. | Mt. Gambier, S.A. |

*By J. L. Provan, B.Agr.Sc., Senior Horticultural Instructor.*

## *Orchard Notes.*

LATE varieties of apples and pears remain to be harvested. This season these varieties have benefited by the February and March rains, and growers are not so anxious to harvest them as early as in past years. Some growers commenced picking Yates during the first week of April last season, because shippers desired early consignments for the London market. Such early harvesting is not in the best interests of this and other varieties, because full flavour and quality will not develop in the picked fruit. Another reason, this season, why growers are not picking so early is that codling moth has been less prevalent in March, which is usually a particularly favorable month for moth activity.

The decrease in codling moth population in the autumn was due probably to the effects of the extremely high temperatures in the first half of January. These temperatures coincided with a period of moth activity. The apparent lull in moth activity experienced in March, however, should not cause growers to relax orchard hygiene. The opportunity exists now, to still further depress the moth population by destroying over-wintering larvae and pupae sheltering under bark, in props, cases, and in debris on, and under, the trees. Cases may be treated by dipping them in a solution of 1 lb. of washing soda in 20 gallons of boiling water. As soon as harvesting is completed, bands should be removed from the trees and destroyed. Careful growers will examine occasional bands to determine their effectiveness in destroying larvae and pupae.

Growers who have not had an opportunity to sow cover crops can still do so while the soil retains some of its warmth. This year the high price of beans and peas has prevented some growers from sowing these crops, but it would be a good practice, in such cases, to sow barley or oats at the rate of 2 bushels per acre with 2 cwt. of superphosphate, and, where the soil is low in fertility, to add 1 or 2 cwt. of sulphate of ammonia or nitrate of soda. The latter nitrogenous fertilizer could be used on acid soil types in southern Victoria with beneficial results.

From the middle of April early Navel oranges will commence arriving on the Melbourne markets from the early Murray River districts. Before the harvest commences, growers should submit samples of their fruit to the packing houses to ascertain whether the desired stage of maturity

has been reached. When submitting samples choose, at random, the smallest fruit intended to be picked and have at least five, but preferably eight oranges, in the sample for test. If large fruit only is submitted and passes the test, do not attempt to pick small fruit without having a separate test of this fruit made. In this way rejections, at the market end, on account of immaturity, will be less frequent.

Apple growers in some districts have suffered losses due to a dark brown rot appearing in the calyx of the fruit. The Biologist of the Department has identified this infection as the Botrytis fungus, which has gained admittance through the calyx, and owing to favorable conditions of warmth and humidity has developed rapidly. The danger of this infection is that apparently-sound fruit may be packed, and after several days the fungus develops; when the case is opened many fruits will be rotten. The fungus will also develop slowly in cool store. Unfortunately, there is no known control for this disease and in orchards where the fruit is badly affected growers should not attempt to store the apparently-sound fruit.

In the north-eastern districts walnuts will be harvested this month. They should be picked up regularly and dried thoroughly under shady and airy conditions. A good bleaching solution consists of 25 lb. chloride of lime, 18 lb. washing soda and 50 gallons of water. This mixture is allowed to settle and the clear liquid drawn off. To this clear liquid, sulphuric acid is added at the rate of $1\frac{1}{4}$ lb. to 425 lb. of the solution. Immerse the nuts for from 5 to 10 seconds and dry immediately.

Passion fruit growers are advised to adopt the new half-bushel case for packing their produce. This case is 18 in. x $5\frac{1}{4}$ in. x $11\frac{1}{2}$ in., and these dimensions allow for exact dozens of fruit to be packed, e.g., 16 dozen, 17 dozen, and so on, per box. This case is very suitable for the local and interstate markets.

# The Flower Garden.

*By A. W. Jessep, M.Agr.Sc., B.Sc., Dip. Ed., Principal, School of Horticulture, Burnley*

SPLENDID rains have completely changed the appearance of the gardens. Fortunately, lawns have shown their power of recovery. In this Journal for last month the methods of treatment suggested should be followed as circumstances require.

Preparations for seed sowing should be well in hand. The following seeds may be planted during April: Cineraria, poppy, ranunculus, anemone, stock, pansy, viola, antirrhinum, calendula, carnation, and primula. Sow winter sweet-peas, nemesia and mignonette where they are to grow. Also make plantings of ranunculus and anemone bulbs this month.

*The Carnation.*

Dahlias should still be flowering profusely, and if the blooms are picked regularly, will continue to do so until early in May. Autumn annuals should be removed and the beds made ready for planting out for the spring display.

One of the most satisfactory bedding annuals for winter blooms is the calendula or winter marigold. It is an old garden plant that has been greatly improved during the last few years, and this improvement has increased its popularity. No garden can afford to be without this splendid winter-flowering plant. In the past, it used to be greatly affected with rust disease, but the trouble may be controlled by spraying the seedling with lime sulphur at the strength of about 1 part lime sulphur to 70 parts water. Repeat this after transplanting, and if any more rust is observed, spray at intervals of a fortnight until it has disappeared. Old plants should not be carried over the summer as they usually harbor the disease.

The seed should be sown early in the year, and the seedlings transplanted after the autumn rains. They should be planted out now as soon as convenient to enable them to become well-established before the cold weather sets in. Select an open position, and give the soil a good dressing of lime.

They will probably commence flowering in June, and if the flowers are picked regularly, they will continue to bloom until the warm weather necessitates their removal for the spring planting. Once established, they require very little attention except for the removal of spent blooms.

During the past few years, calendulas of many new shades have been produced, and it is now possible to procure various cream, pastel, and art shades in addition to the yellow and orange colours. Also, the length of stem and size of flower have both been increased considerably, and the petals have been improved, so that, besides the ordinary type, quilled and feathery ones are obtainable. Some of the best varieties include the following:—

*Orange King.*—One of the old types, but still popular on account of its bright colour. It is a good grower, and blooms for a long period.

*Orange Cockade.*—This is somewhat similar to Orange King, but the flower is a little larger. It is a good double strain, and for general cultivation is superior to Orange King.

*Radio.*—A deep orange variety with beautiful quilled florets, whose colour and shade give it a very attractive appearance. It is one of the newer types.

*Orange Shaggy.*—A new type, having long stems and long fringed chrysanthemum-like petals which should become popular.

*Apricot Queen.*—This is of apricot shading merging into an art shade, and is popular as a cut flower.

*Lemon Queen.*—One of the older types with large flat flowers.

*Chrysantha.*—Also called Sunshine. It has long stalks which produce large, clear, buttercup yellow flowers, with more pronounced chrysanthemum florets than those of Orange Shaggy.

As the calendula is so useful for the winter cut-flower trade, further improvements are likely to take place in the near future. Although it seeds very freely, it is not advisable for the amateur to collect his own seed. Unless selected skillfully, the plants appear to revert very quickly to the old type. The seed is cheap, and has a good percentage of germination.

## *Vegetables.*

While the soil was still warm after last month's rain, the vegetables previously planted out came into growth rapidly. The soil has been consolidated by the rain, and it should now be well worked between the rows. Early cabbages and such crops should have their soil drawn towards them. This hilling-up process helps to hold the roots more firmly in the ground and stimulates growth.

Asparagus tops should be cut off and removed, and the bed given a good dressing with stable manure. If this is not available, market garden manure will do; it should be applied at the rate of about 2 to 2½ oz. per square yard.

Sow seeds of broad bean, beetroot, parsnip, carrot, lettuce, onion, and shallot, and plant out the seedlings of early cabbage, (Eastham and Enfield Market types), and white onion, and arrange for a supply of garden herbs.

With the appearance of the first frost, cucumbers, melons and pumpkins should be removed and the area given its winter clean up.

The parsnip is a vegetable well worth growing. It is a deep-rooted plant and thrives in a deep soil. It is a good plan to grow parsnips on an area which has been liberally fertilized for a preceding crop, such as cabbages, as manuring near the surface at the time of sowing is liable to cause branching of the root. The main crop should be sown in the late spring, but an autumn sowing is useful if a spring crop is also desired. As parsnip seed usually has a poor percentage of germination, sow it rather thickly in rows 15 in. to 18 in. apart, and at a depth of about ¾ in. Firm the soil along the rows.

As soon as the plants are established, thin them out, leaving spaces of 3 or 4 inches. The soil should be kept free of weeds and the surface well stirred. Parsnips are best harvested as desired for cooking, but if the ground is required for other purposes, the roots may be removed and pitted in sand in the open.

There are only two varieties commonly grown. Hollow Crowned is the standard market variety; it is a good grower, and is satisfactory from a culinary viewpoint. Short Thick is a very early variety which makes it suitable for the vegetable garden. When well grown, it is about 6 in. to 8 in. long and 2½ in. to 3 in. thick.

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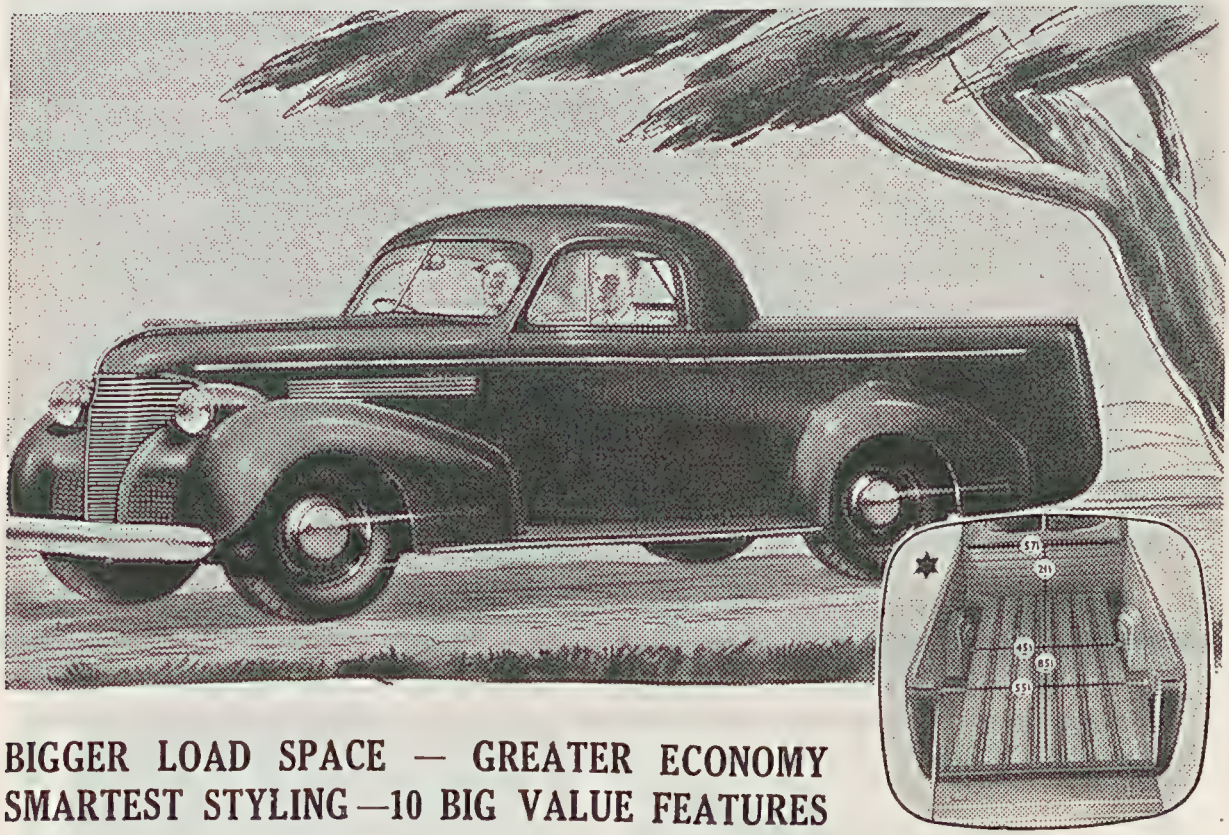


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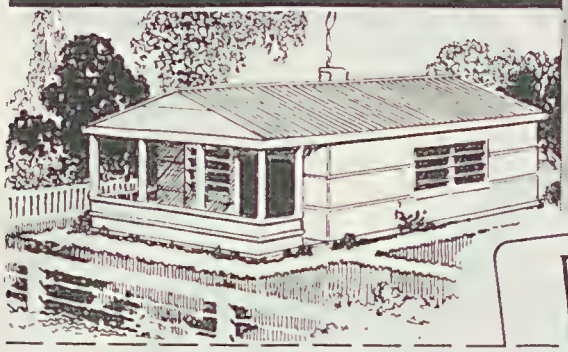

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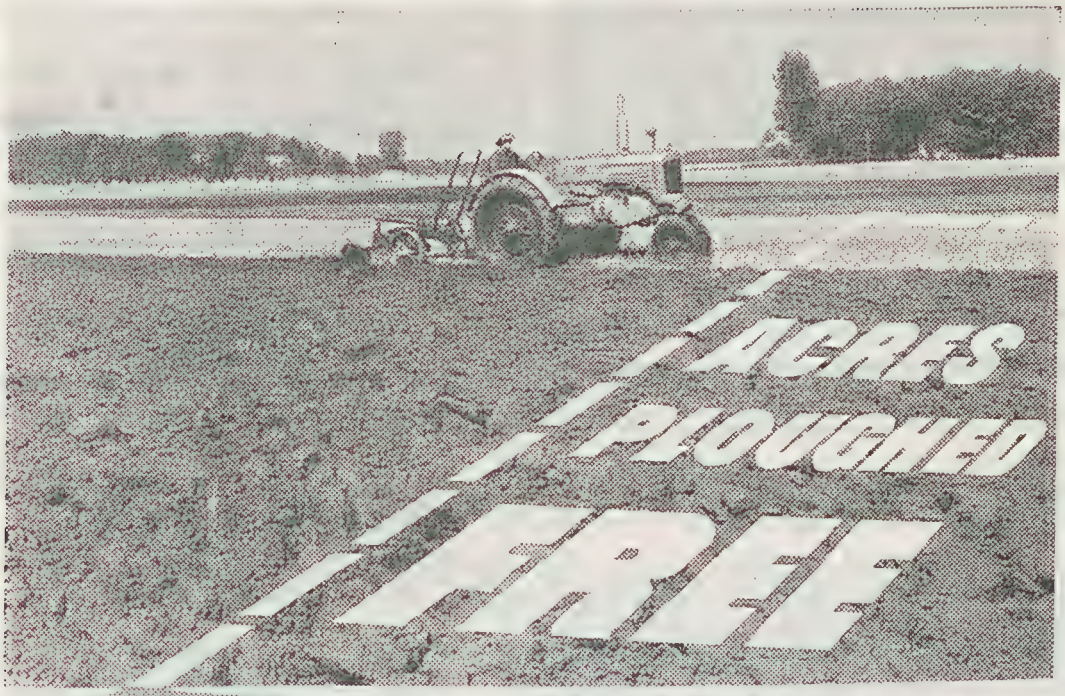


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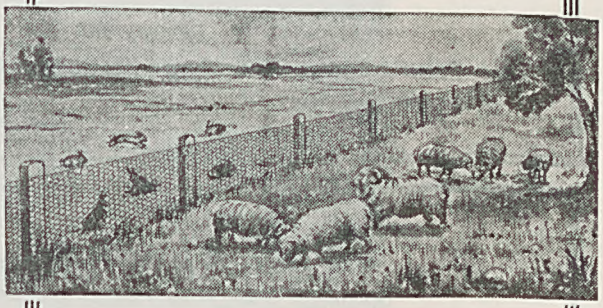

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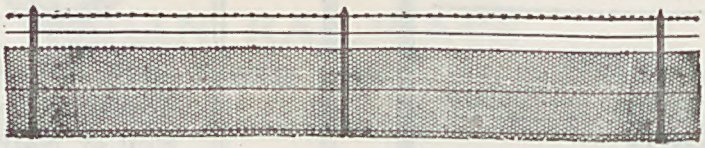

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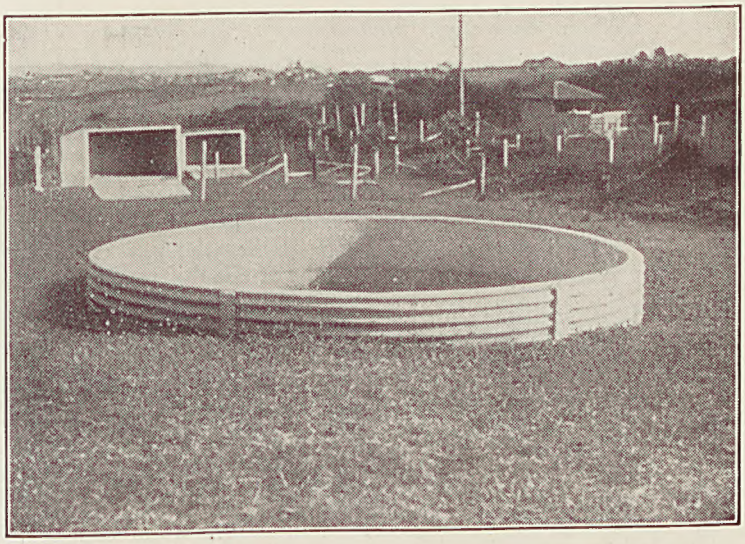

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